FIGURE 1
(Prior Art)

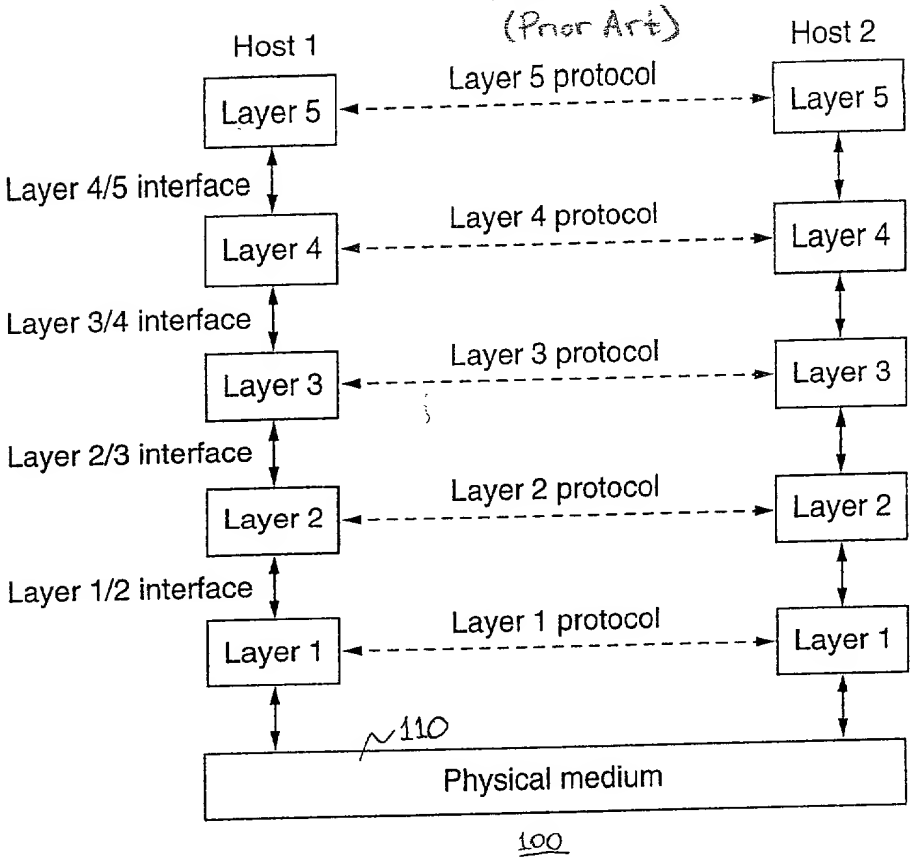


FIGURE 2
(Prior Art)

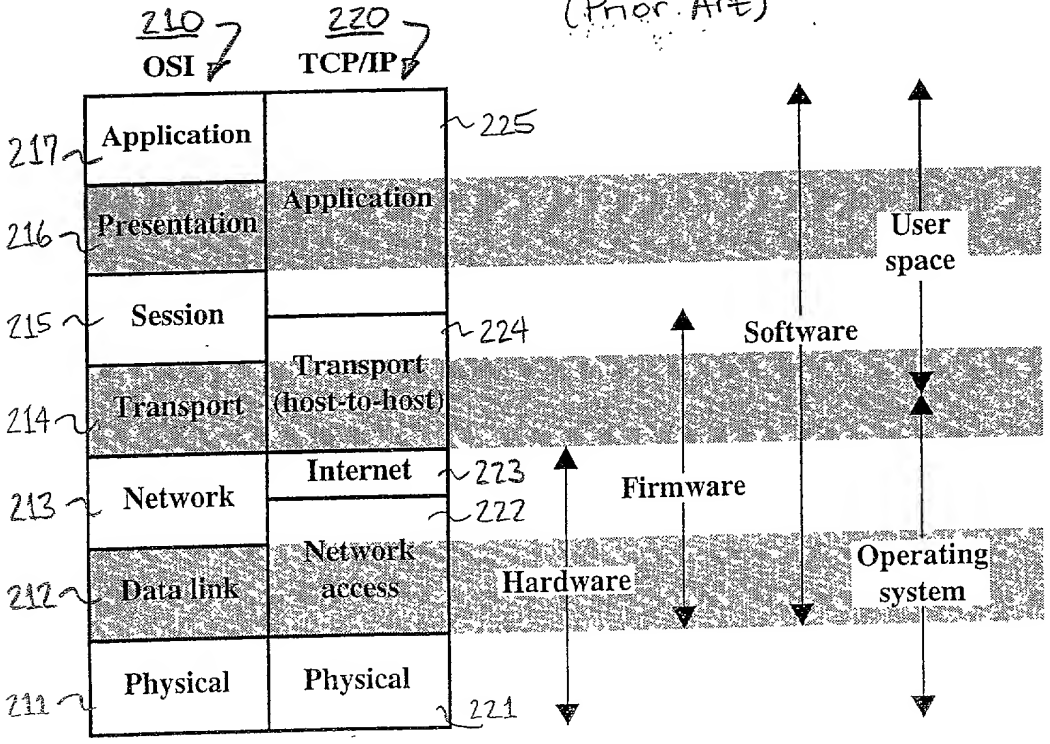
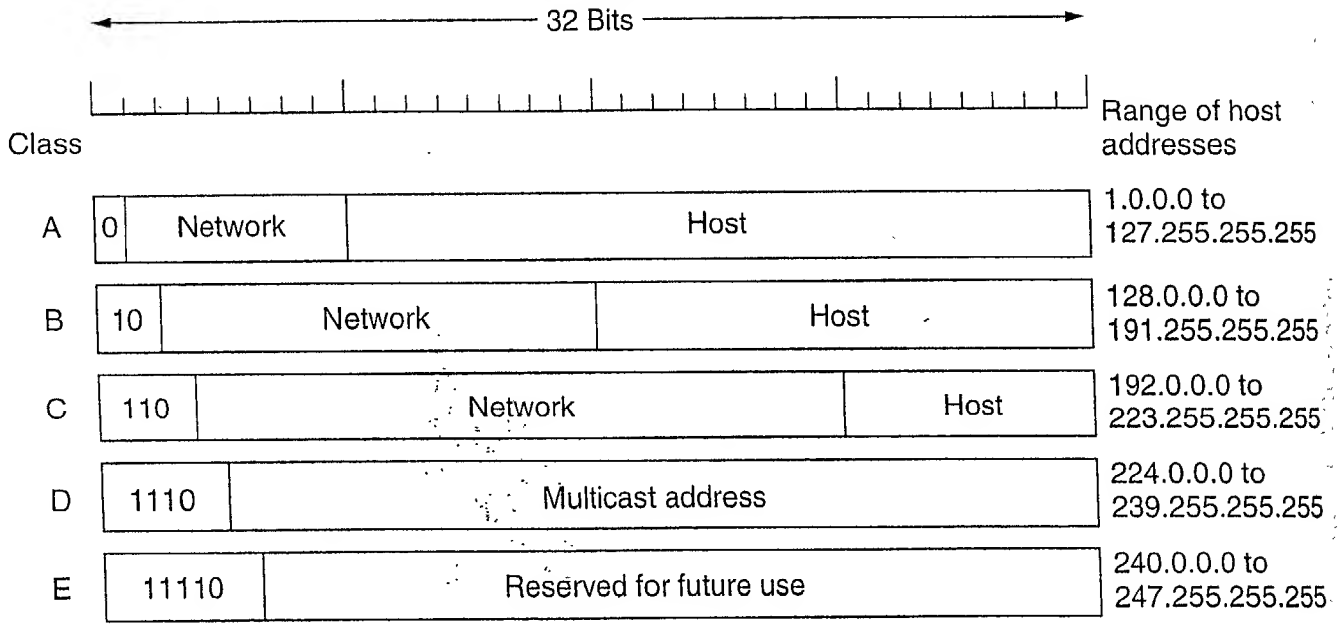


FIGURE 3
(Prior Art)



622/624

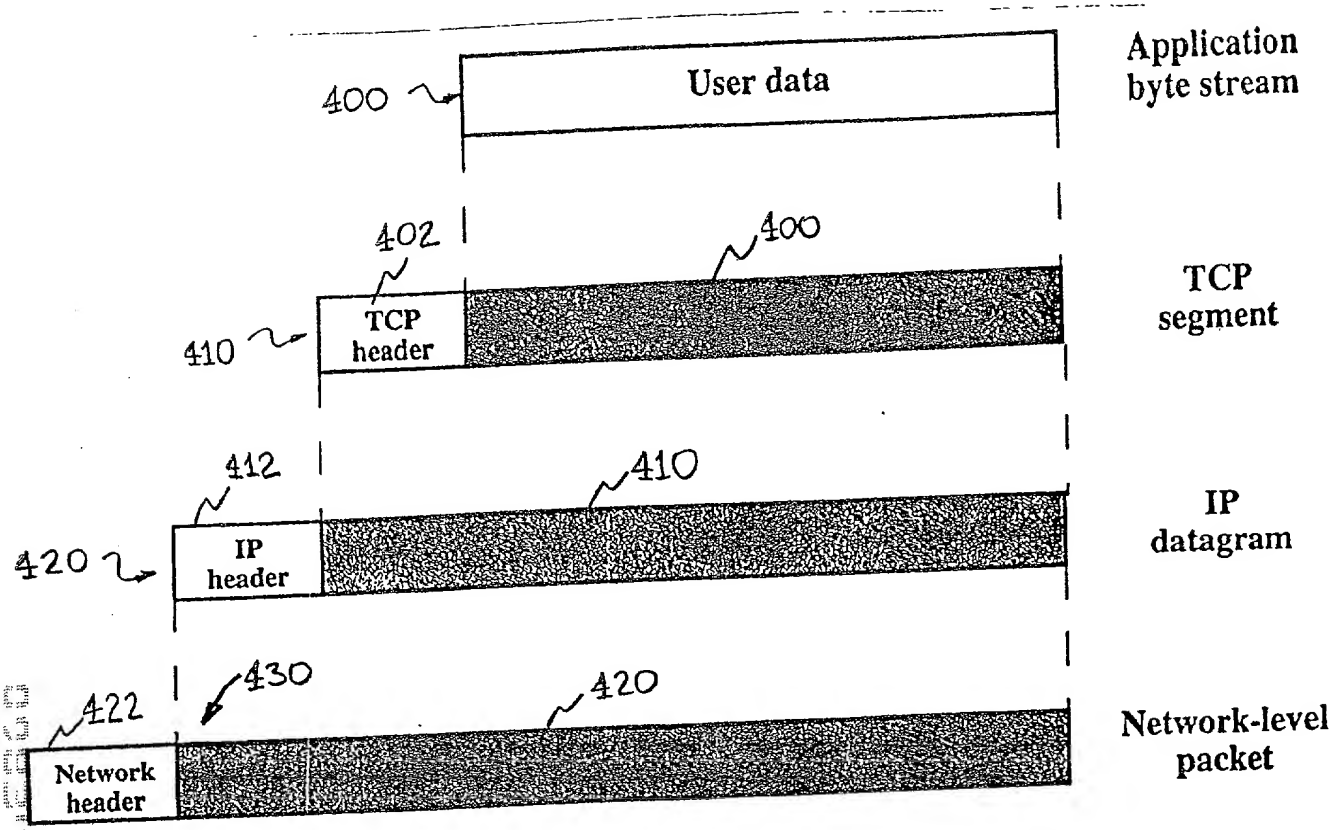


FIGURE 4
(Prior Art)

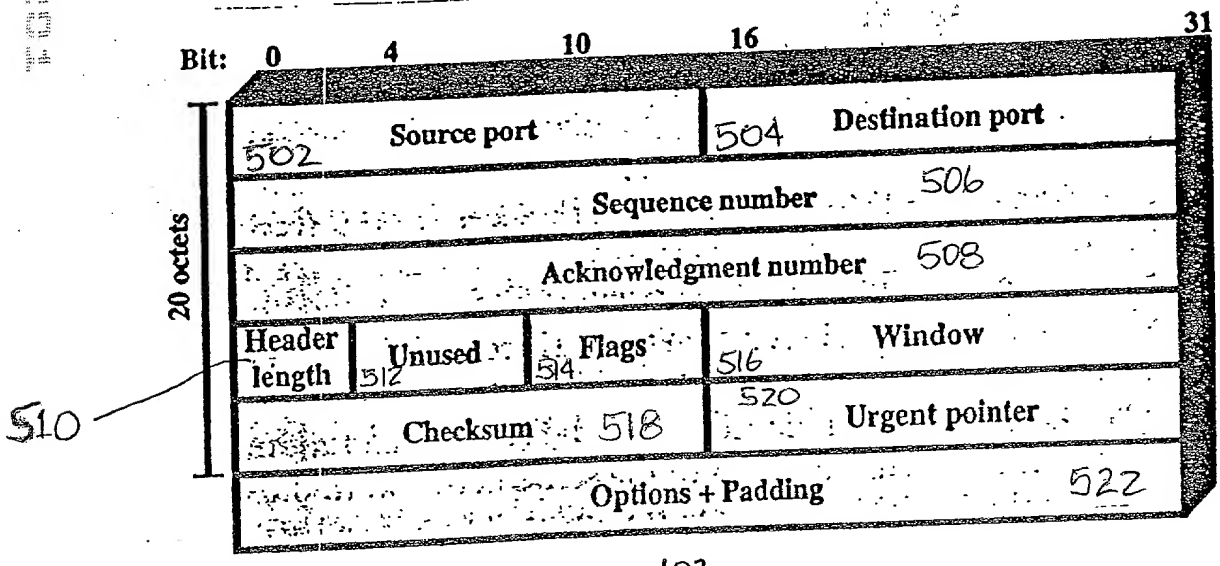


FIGURE 5
(Prior Art)

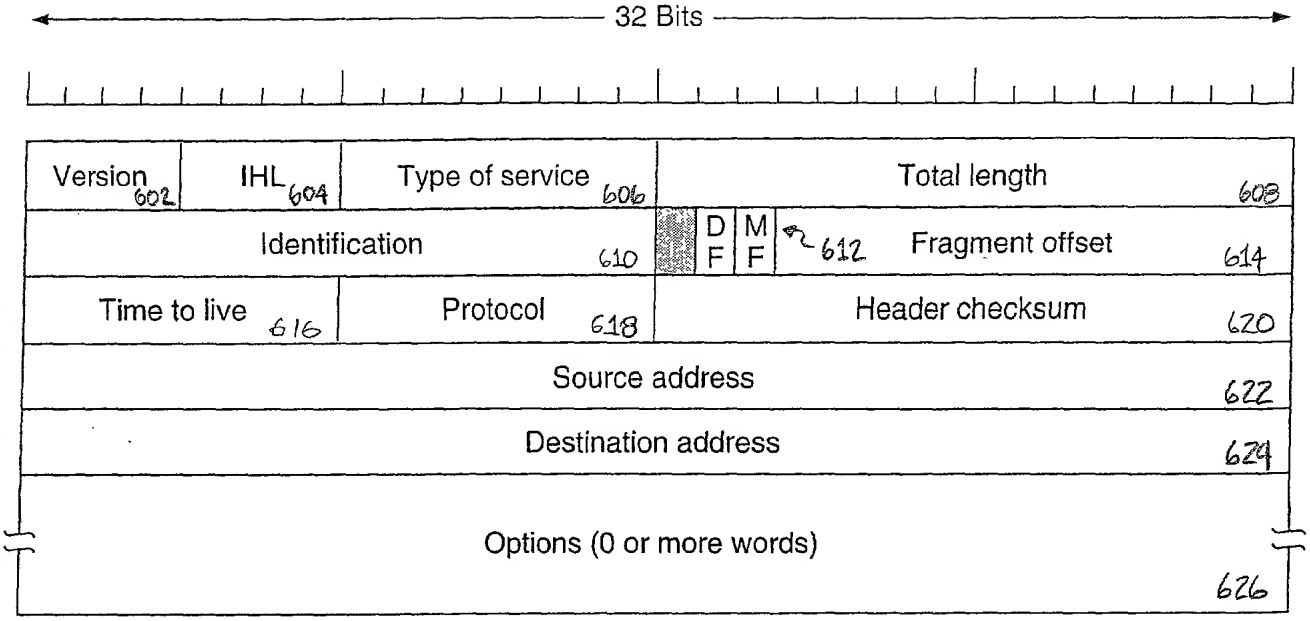


FIGURE 6A

(Prior Art)

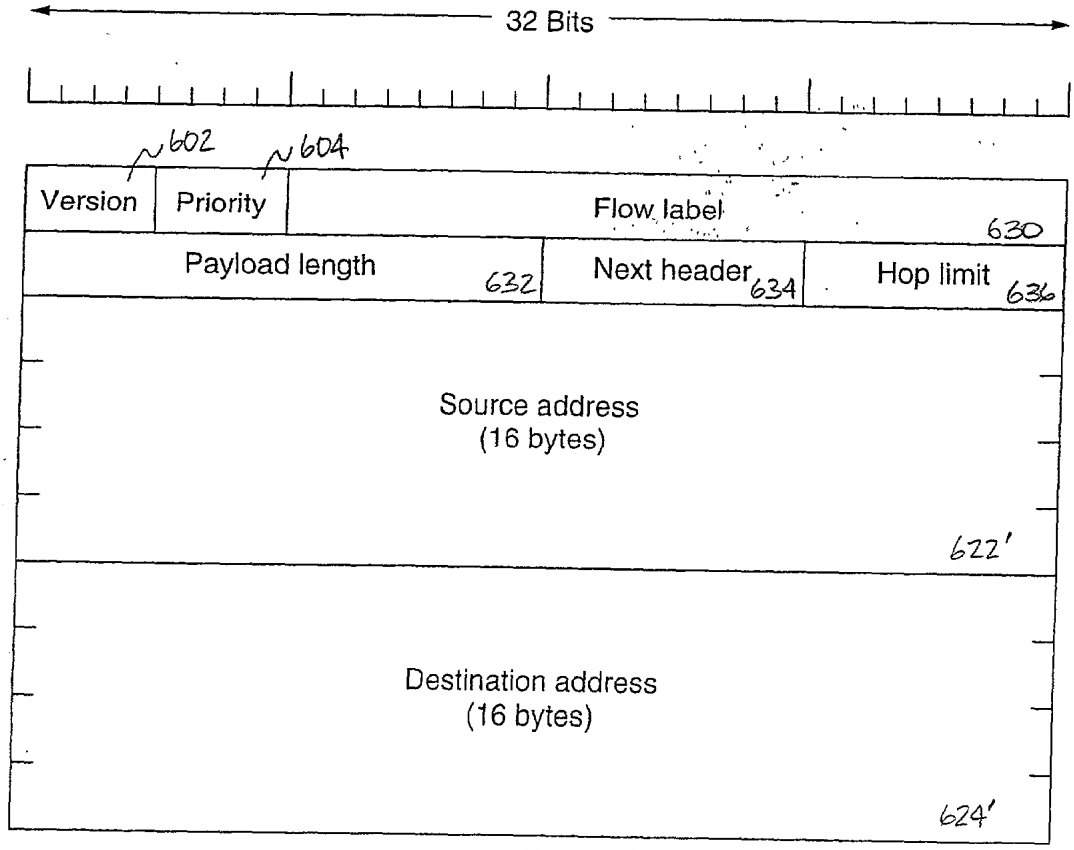


FIGURE 6B

(Prior Art)

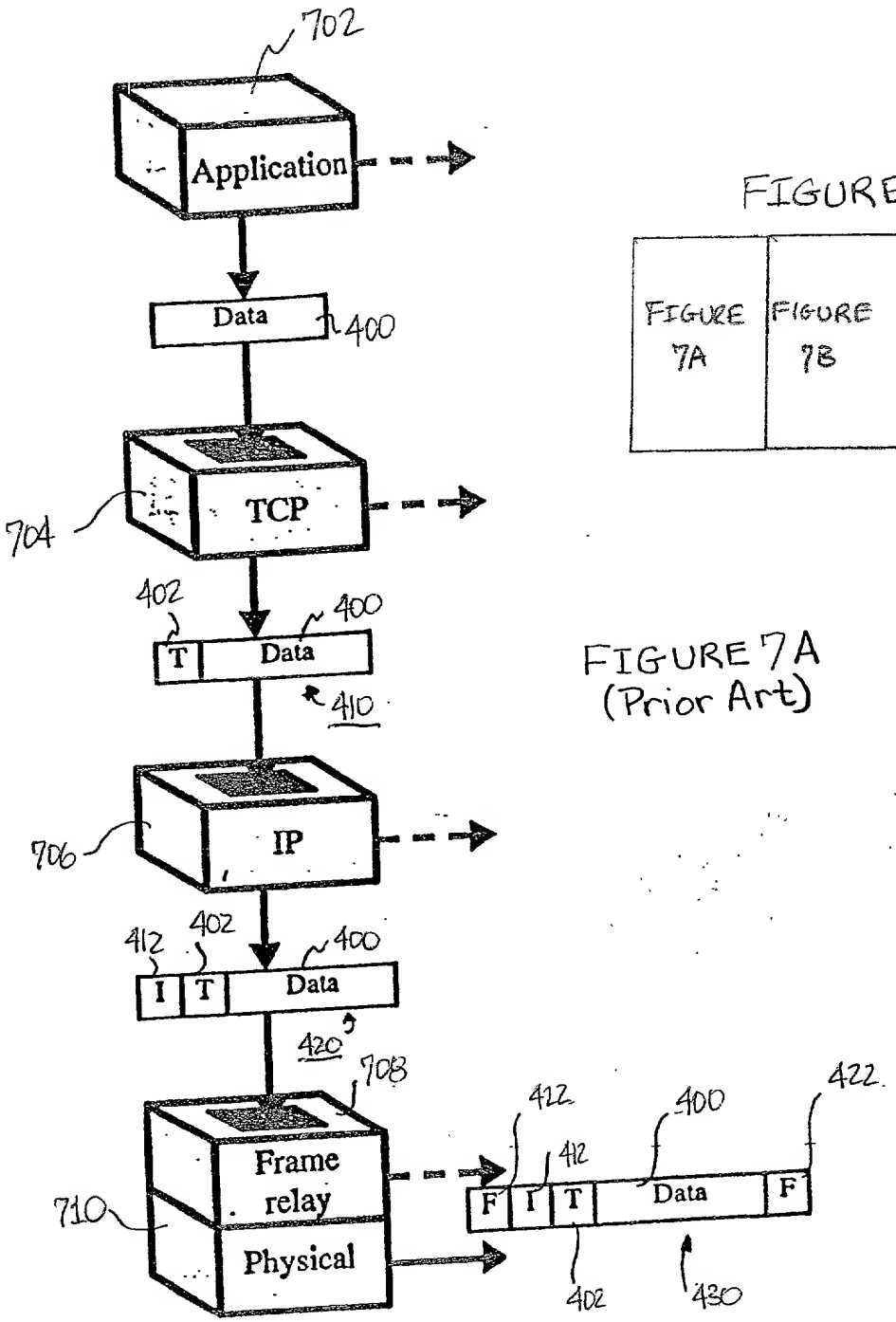


FIGURE 7

FIGURE 7A	FIGURE 7B	FIGURE 7C

FIGURE 7A
(Prior Art)

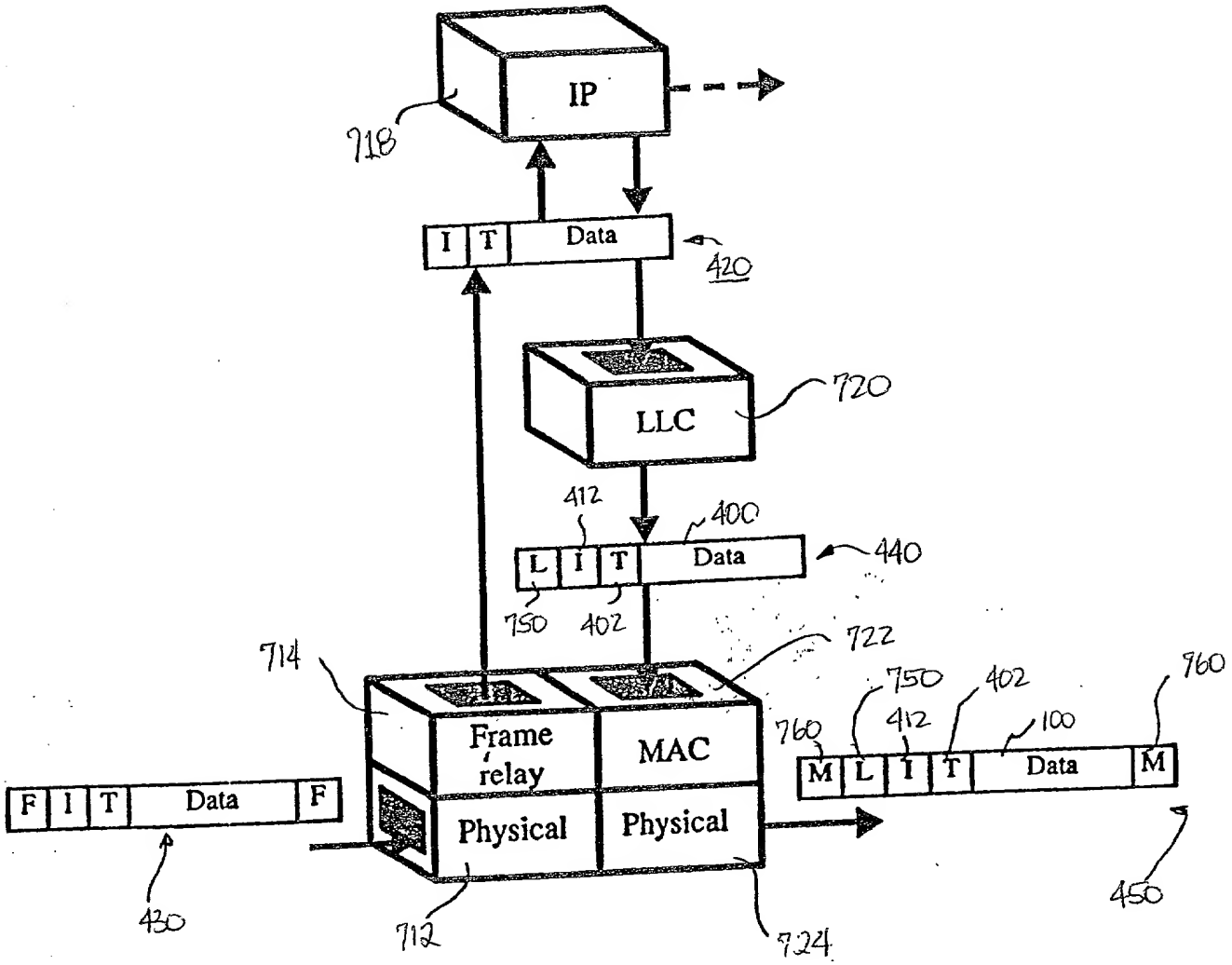

IP
718
I
T
Data
420
LLC
720
412
400
L
I
T
Data
440
750
402
722
714
Frame relay
MAC
Physical
Physical
F
I
T
Data
F
760
750
402
760
412
100
M
L
I
T
Data
M
430
712
724
450

FIGURE 7B

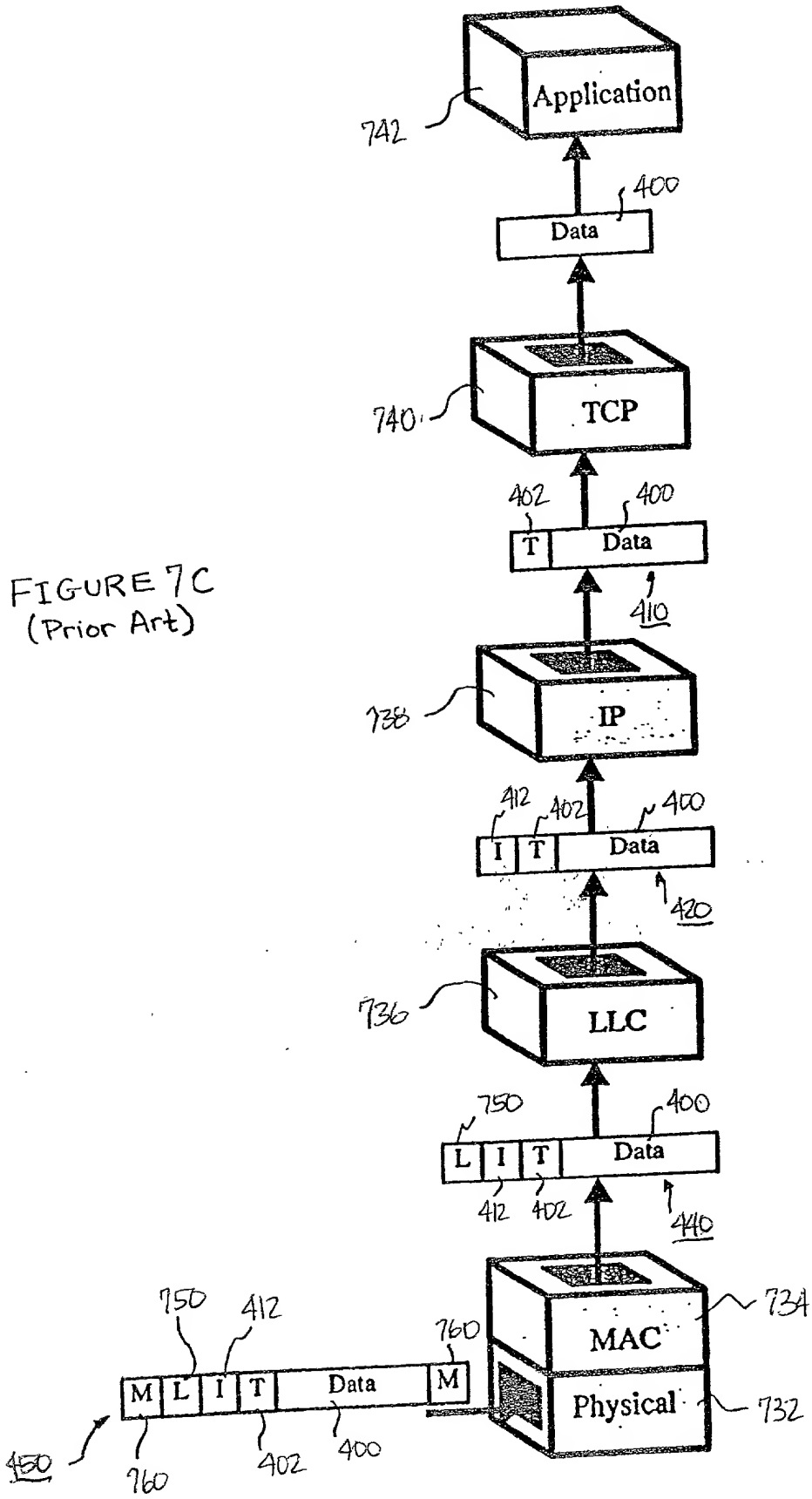


FIGURE 7C
(Prior Art)

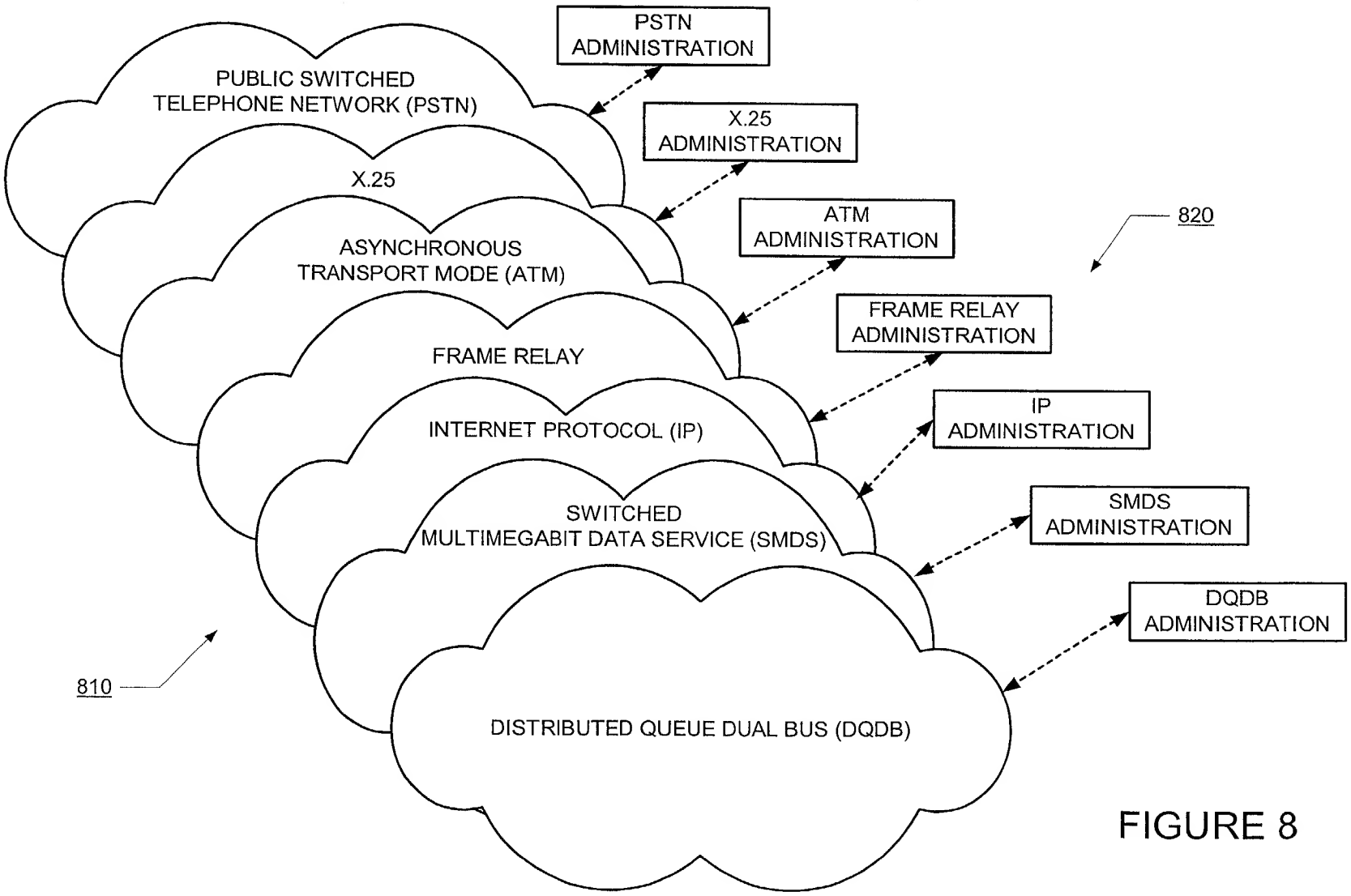

PSTN ADMINISTRATION
PUBLIC SWITCHED TELEPHONE NETWORK (PSTN)
X.25 ADMINISTRATION
X.25
ATM ADMINISTRATION
820
ASYNCHRONOUS TRANSPORT MODE (ATM)
FRAME RELAY ADMINISTRATION
FRAME RELAY
IP ADMINISTRATION
INTERNET PROTOCOL (IP)
SMDS ADMINISTRATION
SWITCHED MULTIMEGABIT DATA SERVICE (SMDS)
DQDB ADMINISTRATION
810
DISTRIBUTED QUEUE DUAL BUS (DQDB)

FIGURE 8

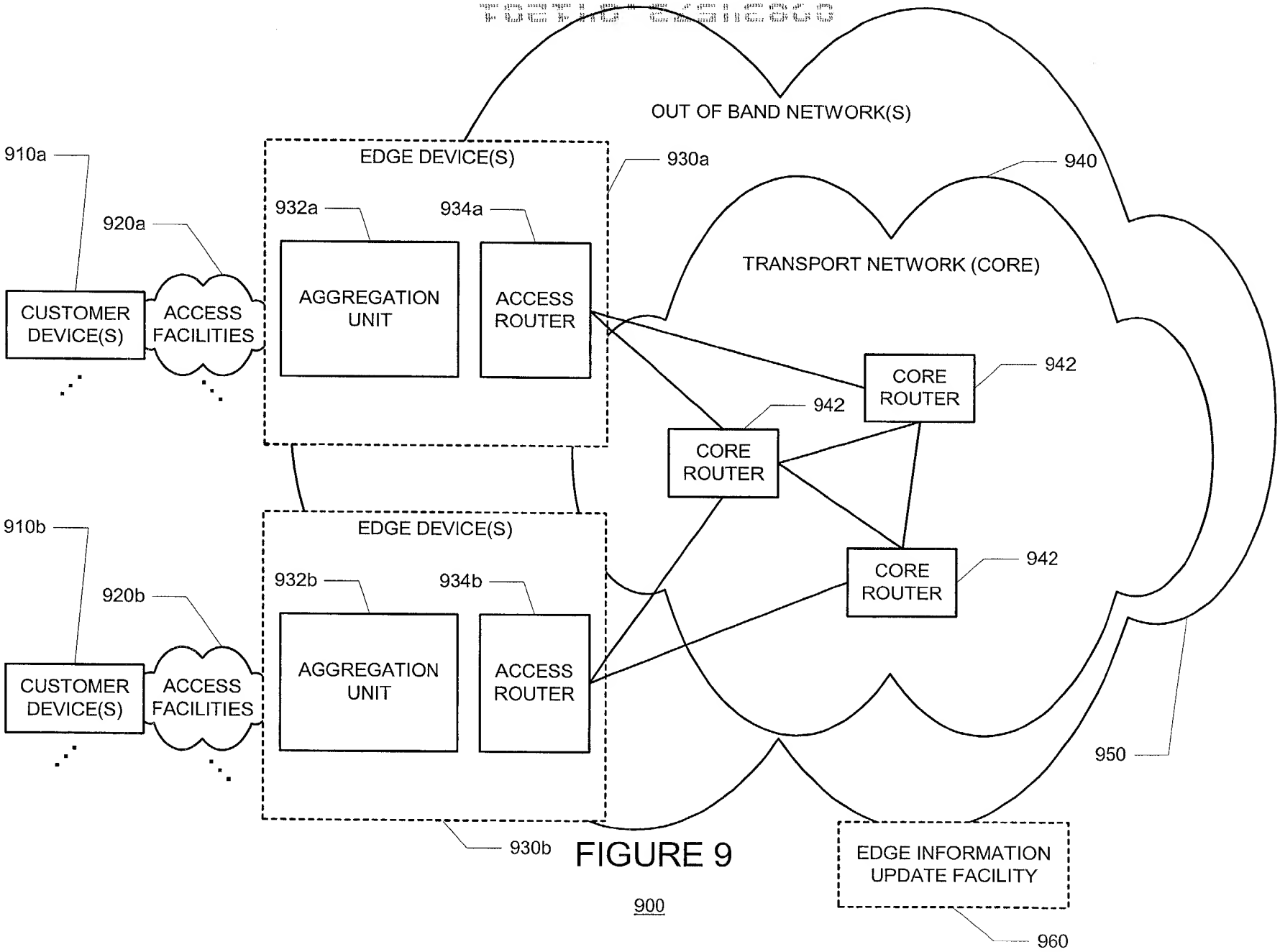

OUT OF BAND NETWORK(S)
910a
EDGE DEVICE(S)
930a
940
920a
932a
934a
TRANSPORT NETWORK (CORE)
CUSTOMER DEVICE(S)
ACCESS FACILITIES
AGGREGATION UNIT
ACCESS ROUTER
CORE ROUTER
942
942
CORE ROUTER
910b
EDGE DEVICE(S)
CORE ROUTER
942
920b
932b
934b
CUSTOMER DEVICE(S)
ACCESS FACILITIES
AGGREGATION UNIT
ACCESS ROUTER
950
930b
EDGE INFORMATION UPDATE FACILITY
960

FIGURE 9

900

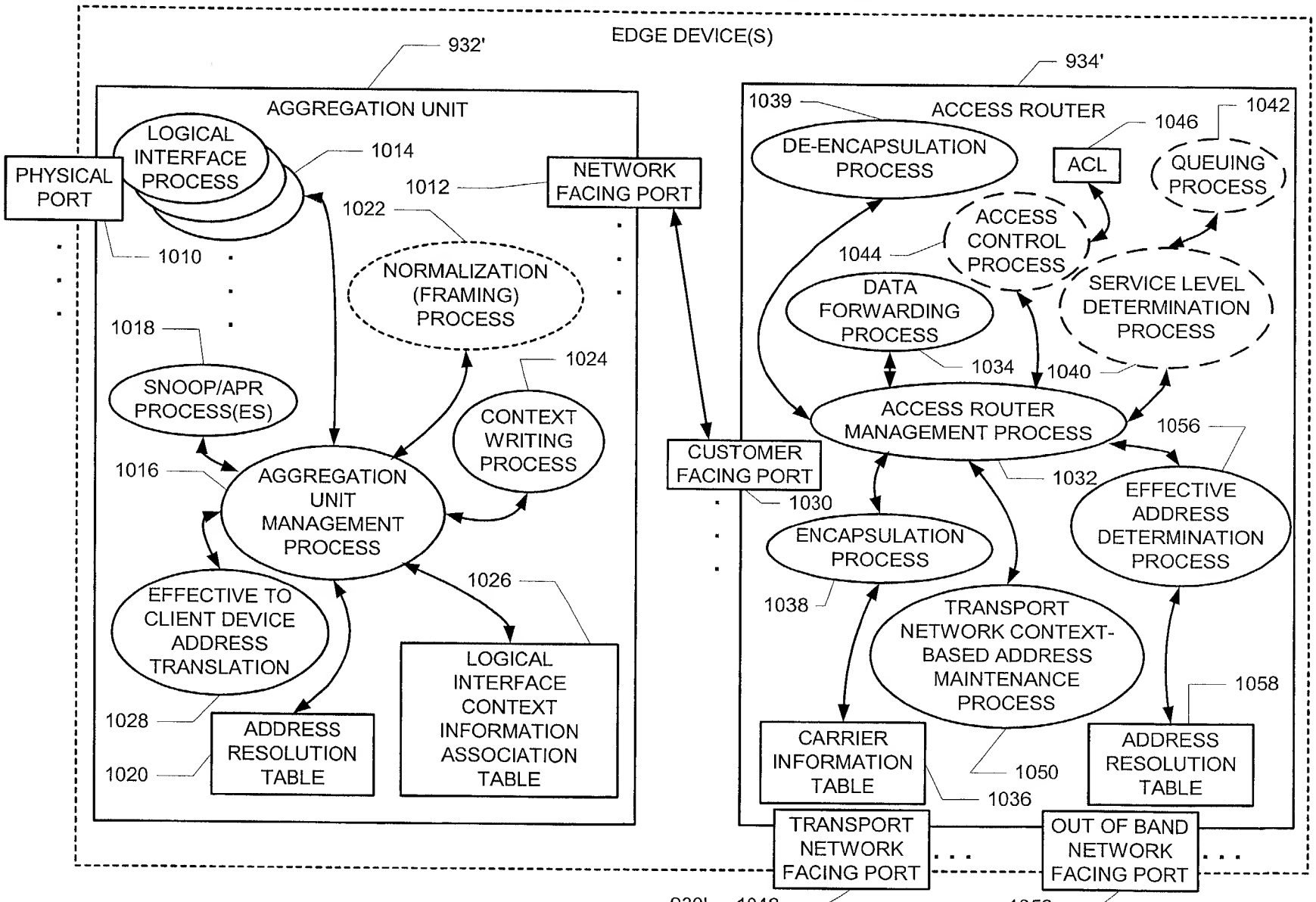

EDGE DEVICE(S)
932'
AGGREGATION UNIT
PHYSICAL PORT
LOGICAL INTERFACE PROCESS
1014
1010
1012
NETWORK FACING PORT
1022
NORMALIZATION (FRAMING) PROCESS
1018
SNOOP/APR PROCESS(ES)
1024
CONTEXT WRITING PROCESS
1016
AGGREGATION UNIT MANAGEMENT PROCESS
EFFECTIVE TO CLIENT DEVICE ADDRESS TRANSLATION
1026
1028
ADDRESS RESOLUTION TABLE
1020
LOGICAL INTERFACE CONTEXT INFORMATION ASSOCIATION TABLE
CUSTOMER FACING PORT
1030
934'
1039
ACCESS ROUTER
DE-ENCAPSULATION PROCESS
1046
ACL
1042
QUEUING PROCESS
1044
ACCESS CONTROL PROCESS
DATA FORWARDING PROCESS
SERVICE LEVEL DETERMINATION PROCESS
1034
1040
ACCESS ROUTER MANAGEMENT PROCESS
1056
1032
EFFECTIVE ADDRESS DETERMINATION PROCESS
ENCAPSULATION PROCESS
1038
TRANSPORT NETWORK CONTEXT-BASED ADDRESS MAINTENANCE PROCESS
1058
CARRIER INFORMATION TABLE
1050
1036
ADDRESS RESOLUTION TABLE
TRANSPORT NETWORK FACING PORT
OUT OF BAND NETWORK FACING PORT
930'
1048
1052

FIGURE 10

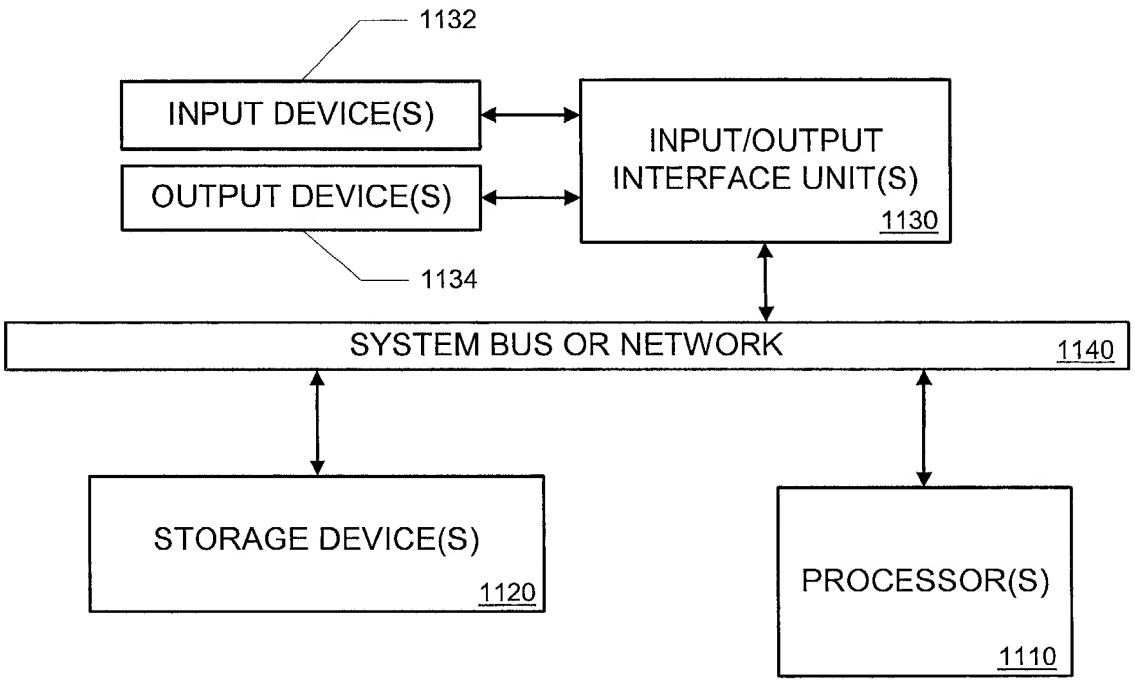

1132
INPUT DEVICE(S)
OUTPUT DEVICE(S)
INPUT/OUTPUT
INTERFACE UNIT(S)
1130
1134
SYSTEM BUS OR NETWORK
1140
STORAGE DEVICE(S)
1120
PROCESSOR(S)
1110
1100

FIGURE 11

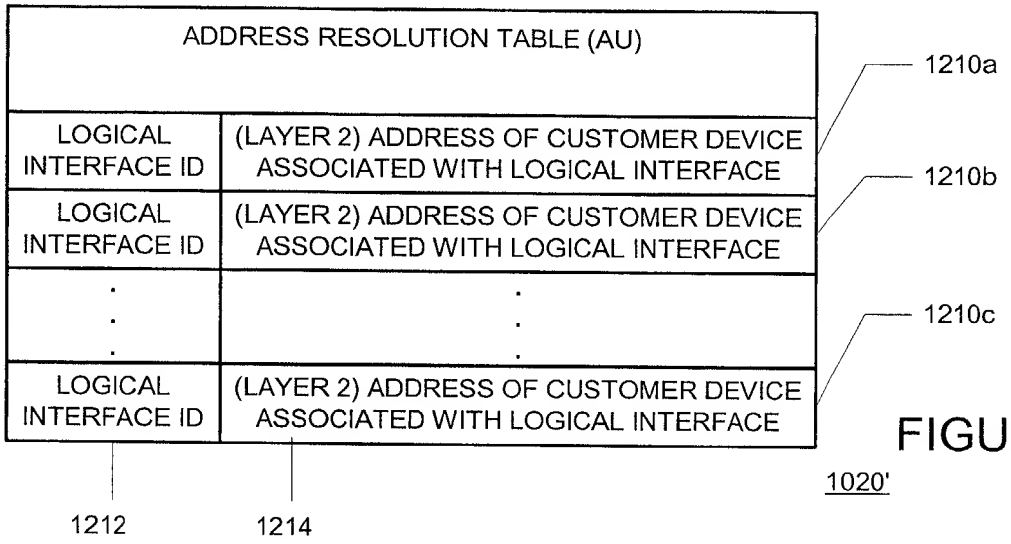


FIGURE 12

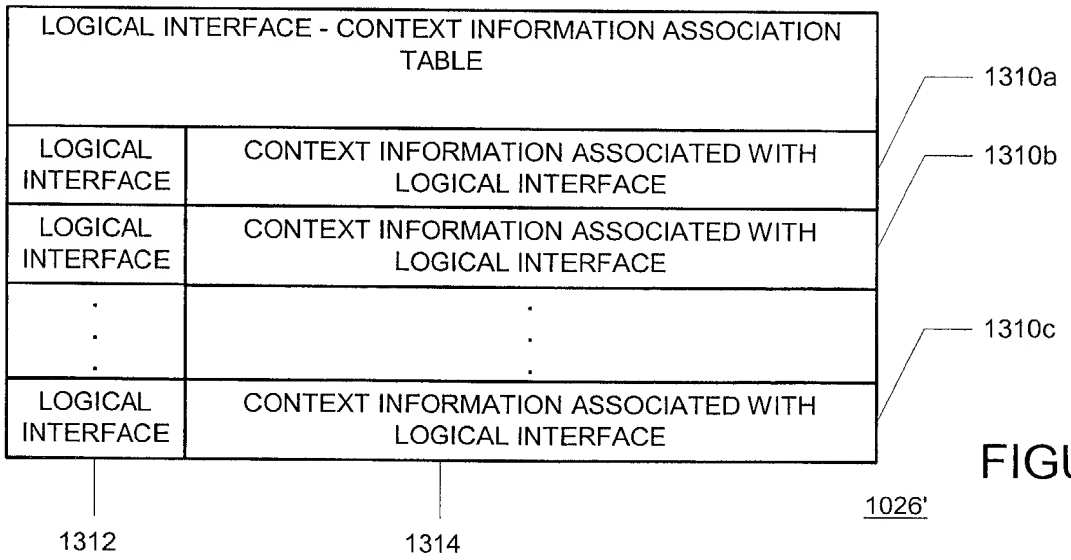


FIGURE 13

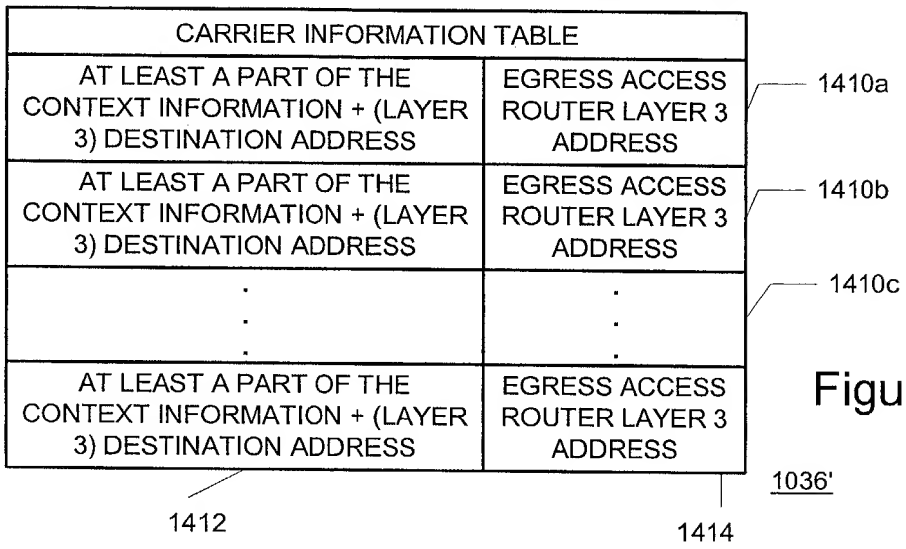


Figure 14

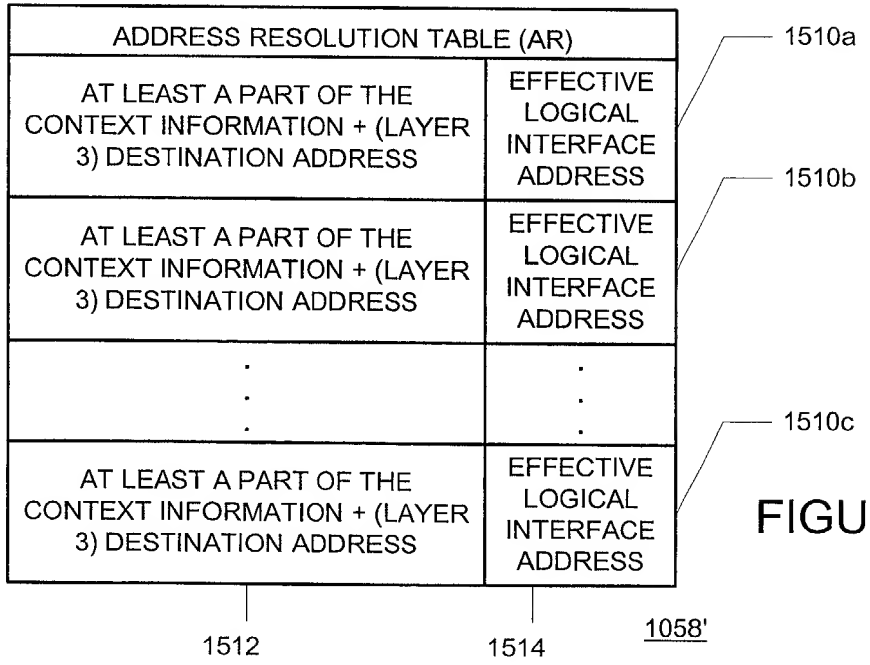


FIGURE 15

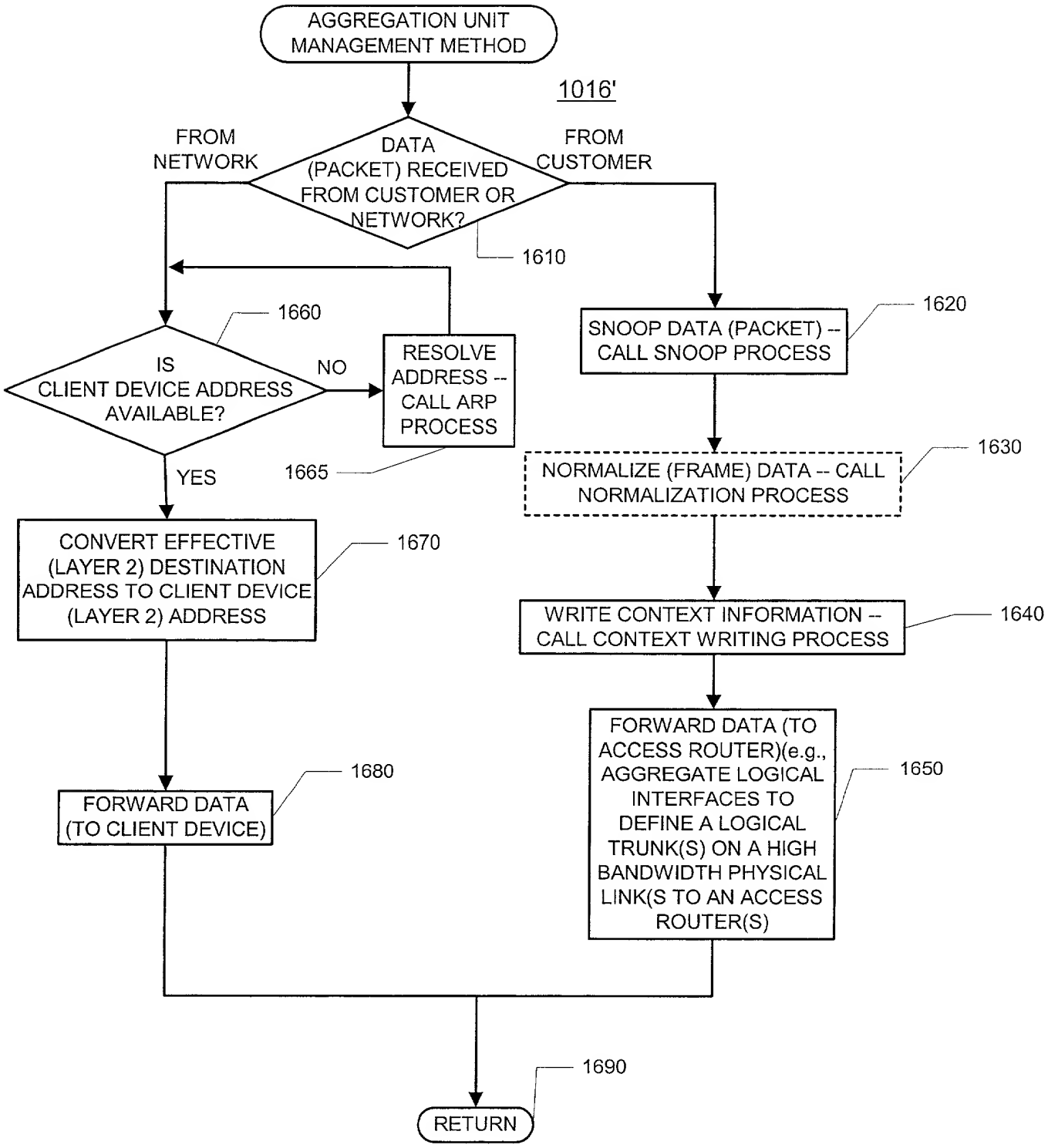

AGGREGATION UNIT MANAGEMENT METHOD
1016'
DATA (PACKET) RECEIVED FROM CUSTOMER OR NETWORK?
1610
FROM NETWORK
FROM CUSTOMER
1660
IS CLIENT DEVICE ADDRESS AVAILABLE?
NO
YES
RESOLVE ADDRESS -- CALL ARP PROCESS
1665
SNOOP DATA (PACKET) -- CALL SNOOP PROCESS
1620
NORMALIZE (FRAME) DATA -- CALL NORMALIZATION PROCESS
1630
CONVERT EFFECTIVE (LAYER 2) DESTINATION ADDRESS TO CLIENT DEVICE (LAYER 2) ADDRESS
1670
WRITE CONTEXT INFORMATION -- CALL CONTEXT WRITING PROCESS
1640
FORWARD DATA (TO ACCESS ROUTER)(e.g., AGGREGATE LOGICAL INTERFACES TO DEFINE A LOGICAL TRUNK(S) ON A HIGH BANDWIDTH PHYSICAL LINK(S TO AN ACCESS ROUTER(S)
1650
FORWARD DATA (TO CLIENT DEVICE)
1680
RETURN
1690

FIGURE 16

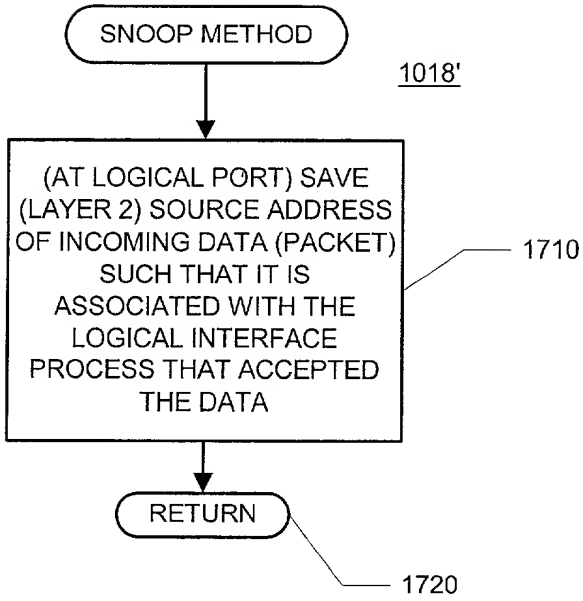

SNOOP METHOD
1018'
(AT LOGICAL PORT) SAVE (LAYER 2) SOURCE ADDRESS OF INCOMING DATA (PACKET) SUCH THAT IT IS ASSOCIATED WITH THE LOGICAL INTERFACE PROCESS THAT ACCEPTED THE DATA
1710
RETURN
1720

FIGURE 17

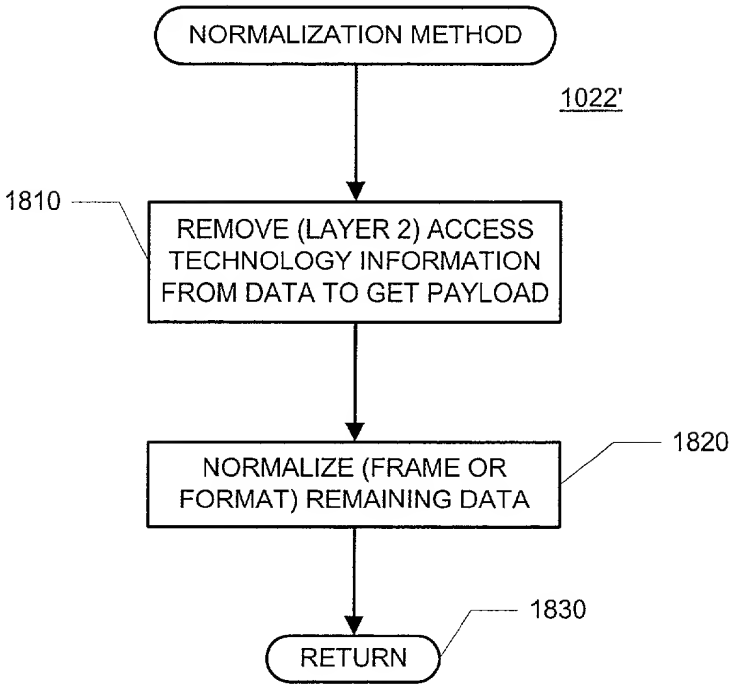

NORMALIZATION METHOD
1022'
1810
REMOVE (LAYER 2) ACCESS TECHNOLOGY INFORMATION FROM DATA TO GET PAYLOAD
NORMALIZE (FRAME OR FORMAT) REMAINING DATA
1820
1830
RETURN

FIGURE 18

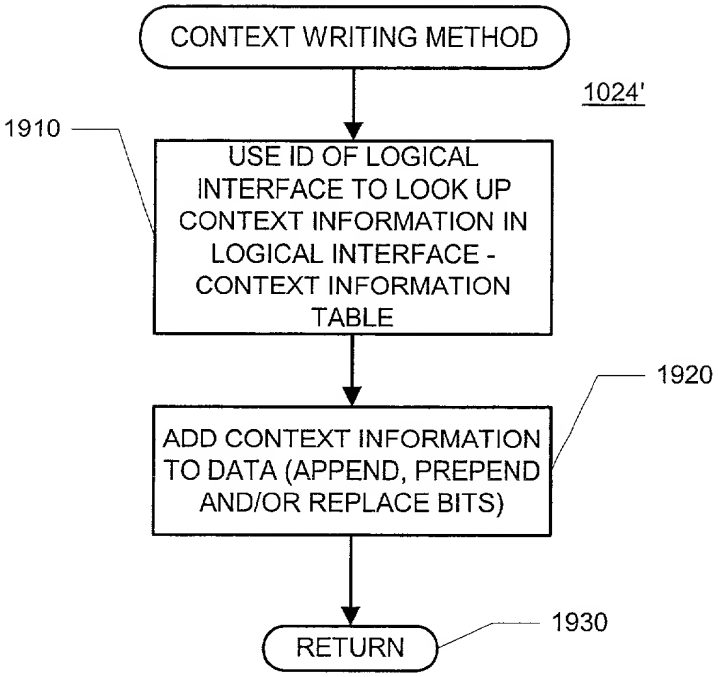

CONTEXT WRITING METHOD
1024'
1910
USE ID OF LOGICAL INTERFACE TO LOOK UP CONTEXT INFORMATION IN LOGICAL INTERFACE - CONTEXT INFORMATION TABLE
1920
ADD CONTEXT INFORMATION TO DATA (APPEND, PREPEND AND/OR REPLACE BITS)
1930
RETURN

FIGURE 19

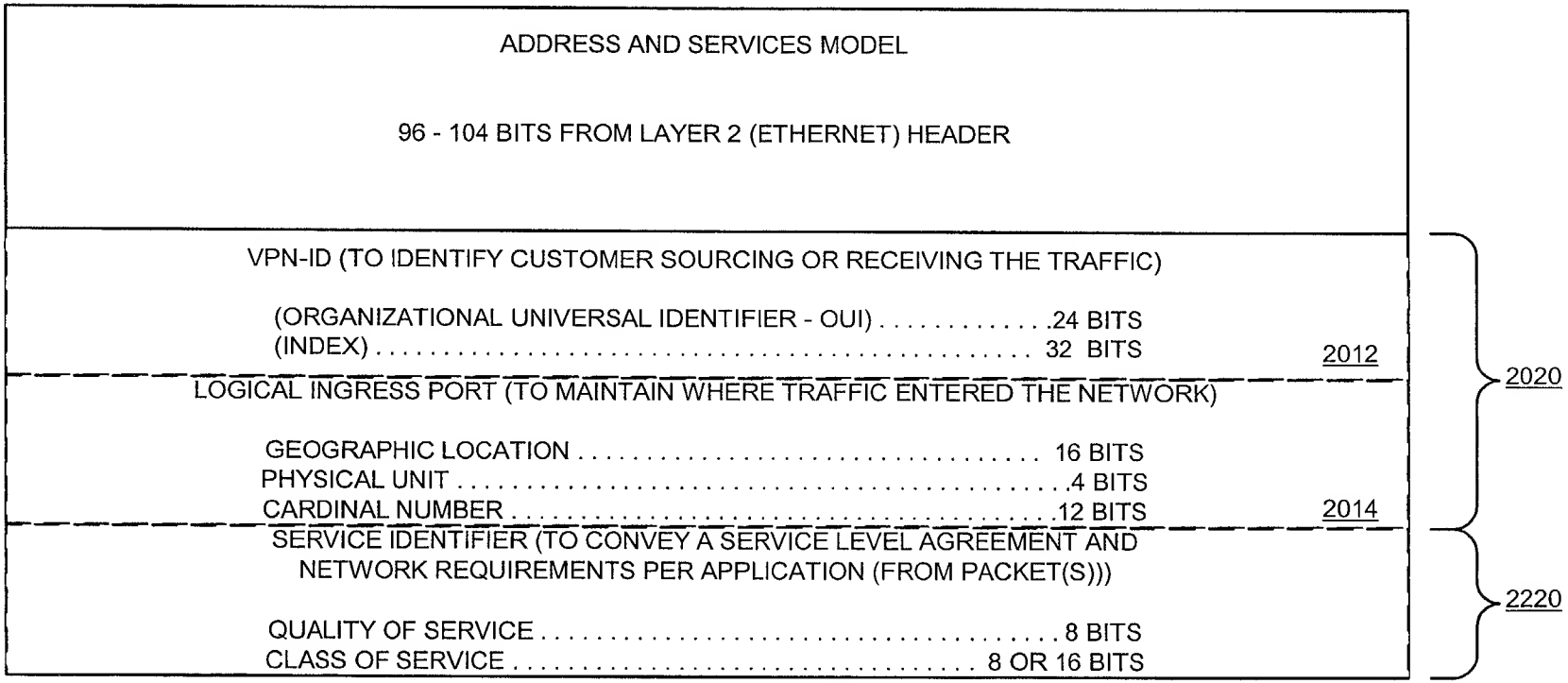

ADDRESS AND SERVICES MODEL
96 - 104 BITS FROM LAYER 2 (ETHERNET) HEADER
VPN-ID (TO IDENTIFY CUSTOMER SOURCING OR RECEIVING THE TRAFFIC)
(ORGANIZATIONAL UNIVERSAL IDENTIFIER - OUI) . . . . . .24 BITS
(INDEX) . . . . . 32 BITS
2012
LOGICAL INGRESS PORT (TO MAINTAIN WHERE TRAFFIC ENTERED THE NETWORK)
GEOGRAPHIC LOCATION . . . . . 16 BITS
PHYSICAL UNIT . . . . . .4 BITS
CARDINAL NUMBER . . . . . .12 BITS
2014
2020
SERVICE IDENTIFIER (TO CONVEY A SERVICE LEVEL AGREEMENT AND NETWORK REQUIREMENTS PER APPLICATION (FROM PACKET(S)))
QUALITY OF SERVICE . . . . . .8 BITS
CLASS OF SERVICE . . . . . 8 OR 16 BITS
2220

FIGURE 20

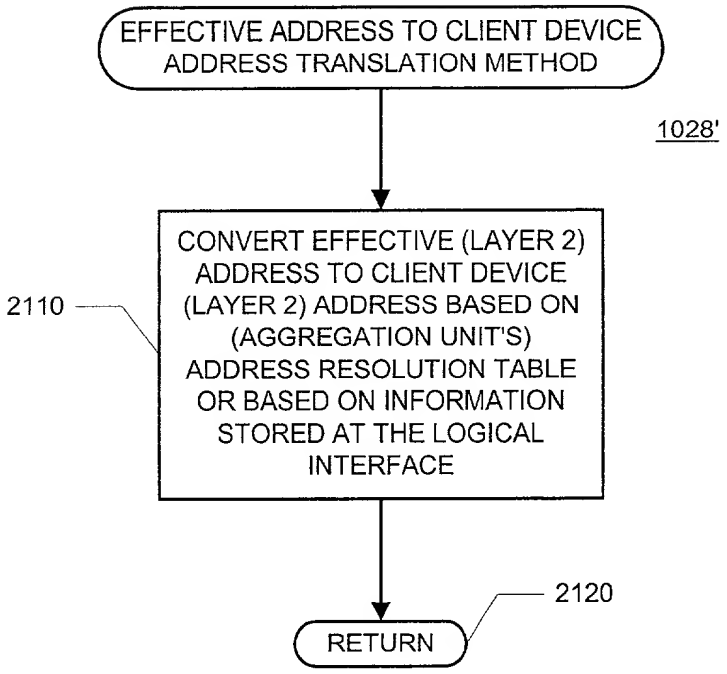

EFFECTIVE ADDRESS TO CLIENT DEVICE ADDRESS TRANSLATION METHOD
1028'
CONVERT EFFECTIVE (LAYER 2) ADDRESS TO CLIENT DEVICE (LAYER 2) ADDRESS BASED ON (AGGREGATION UNIT'S) ADDRESS RESOLUTION TABLE OR BASED ON INFORMATION STORED AT THE LOGICAL INTERFACE
2110
2120
RETURN

FIGURE 21

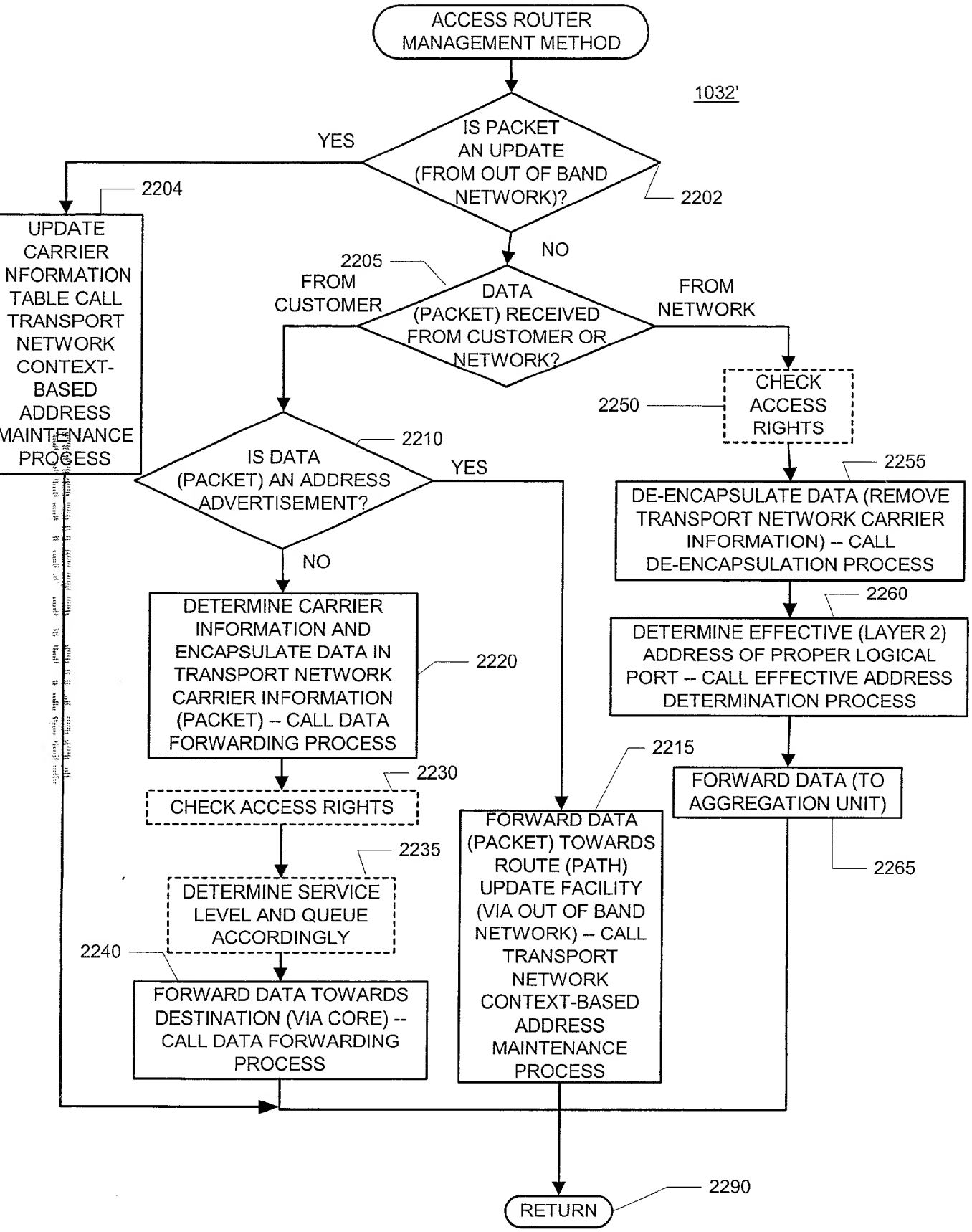

ACCESS ROUTER MANAGEMENT METHOD
1032'
IS PACKET AN UPDATE (FROM OUT OF BAND NETWORK)?
YES
2202
2204
UPDATE CARRIER NFORMATION TABLE CALL TRANSPORT NETWORK CONTEXT-BASED ADDRESS MAINTENANCE PROCESS
NO
2205
DATA (PACKET) RECEIVED FROM CUSTOMER OR NETWORK?
FROM CUSTOMER
FROM NETWORK
CHECK ACCESS RIGHTS
2250
2255
DE-ENCAPSULATE DATA (REMOVE TRANSPORT NETWORK CARRIER INFORMATION) -- CALL DE-ENCAPSULATION PROCESS
2260
DETERMINE EFFECTIVE (LAYER 2) ADDRESS OF PROPER LOGICAL PORT -- CALL EFFECTIVE ADDRESS DETERMINATION PROCESS
2210
IS DATA (PACKET) AN ADDRESS ADVERTISEMENT?
YES
NO
DETERMINE CARRIER INFORMATION AND ENCAPSULATE DATA IN TRANSPORT NETWORK CARRIER INFORMATION (PACKET) -- CALL DATA FORWARDING PROCESS
2220
2230
CHECK ACCESS RIGHTS
2215
FORWARD DATA (TO AGGREGATION UNIT)
2265
2235
DETERMINE SERVICE LEVEL AND QUEUE ACCORDINGLY
2240
FORWARD DATA TOWARDS DESTINATION (VIA CORE) -- CALL DATA FORWARDING PROCESS
FORWARD DATA (PACKET) TOWARDS ROUTE (PATH) UPDATE FACILITY (VIA OUT OF BAND NETWORK) -- CALL TRANSPORT NETWORK CONTEXT-BASED ADDRESS MAINTENANCE PROCESS
RETURN
2290

FIGURE 22

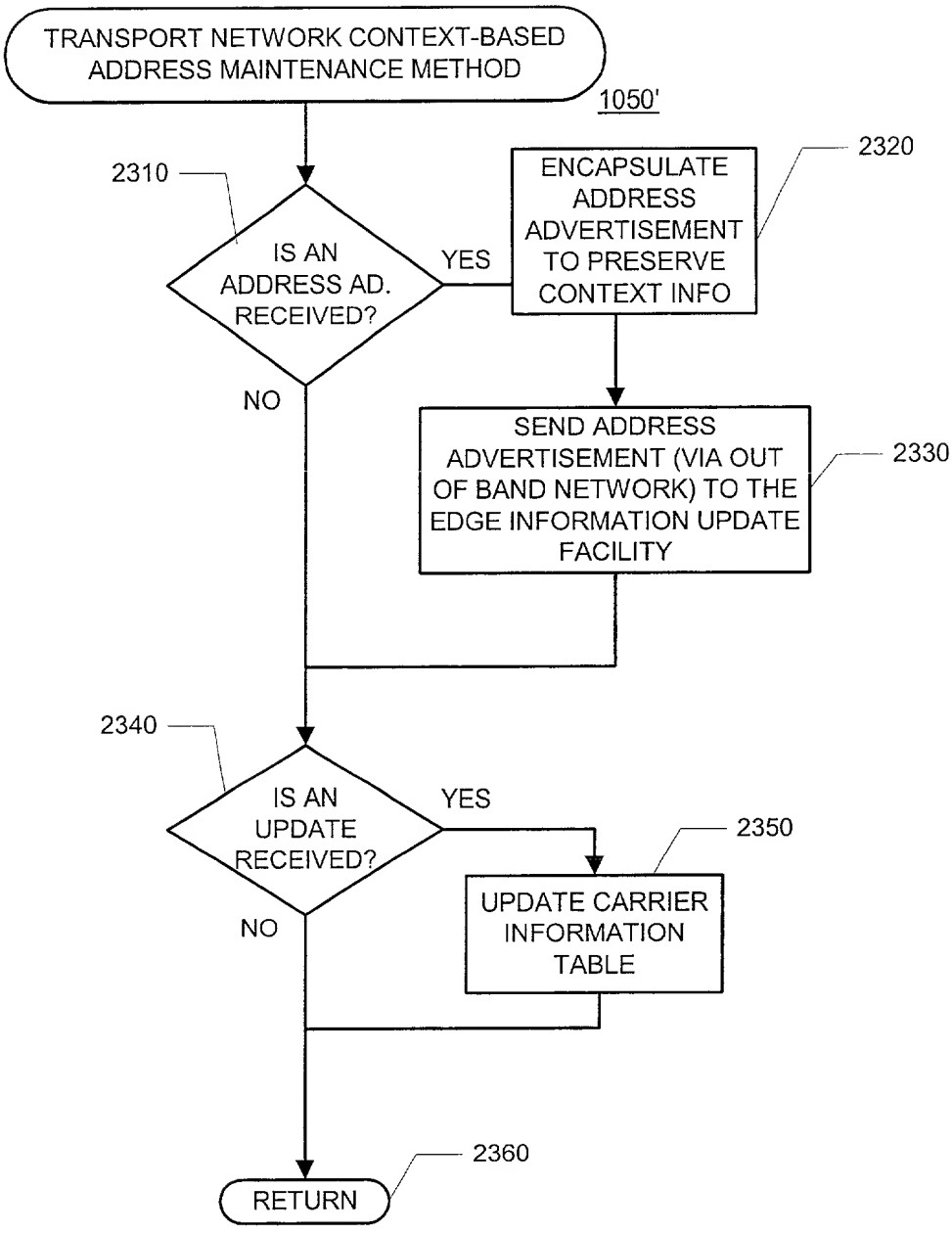

TRANSPORT NETWORK CONTEXT-BASED ADDRESS MAINTENANCE METHOD
1050'
2310
IS AN ADDRESS AD. RECEIVED?
YES
NO
ENCAPSULATE ADDRESS ADVERTISEMENT TO PRESERVE CONTEXT INFO
2320
SEND ADDRESS ADVERTISEMENT (VIA OUT OF BAND NETWORK) TO THE EDGE INFORMATION UPDATE FACILITY
2330
2340
IS AN UPDATE RECEIVED?
YES
NO
2350
UPDATE CARRIER INFORMATION TABLE
2360
RETURN

FIGURE 23

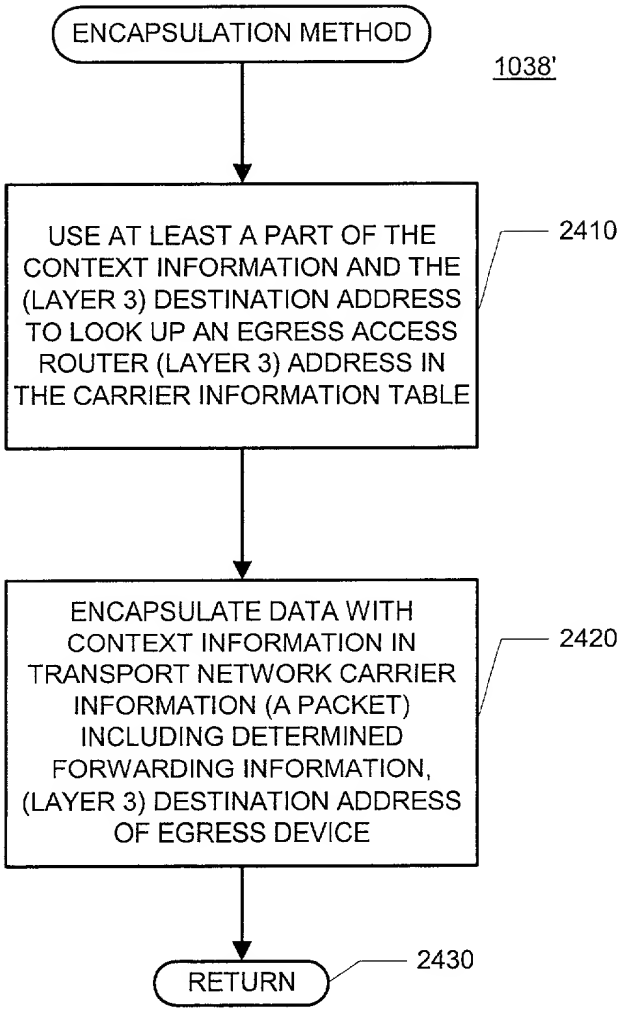

ENCAPSULATION METHOD
1038'
USE AT LEAST A PART OF THE CONTEXT INFORMATION AND THE (LAYER 3) DESTINATION ADDRESS TO LOOK UP AN EGRESS ACCESS ROUTER (LAYER 3) ADDRESS IN THE CARRIER INFORMATION TABLE
2410
ENCAPSULATE DATA WITH CONTEXT INFORMATION IN TRANSPORT NETWORK CARRIER INFORMATION (A PACKET) INCLUDING DETERMINED FORWARDING INFORMATION, (LAYER 3) DESTINATION ADDRESS OF EGRESS DEVICE
2420
RETURN
2430

FIGURE 24

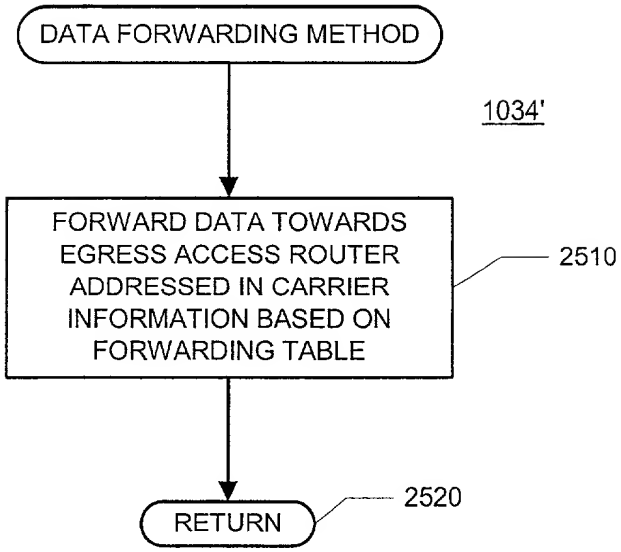

DATA FORWARDING METHOD
1034'
FORWARD DATA TOWARDS EGRESS ACCESS ROUTER ADDRESSED IN CARRIER INFORMATION BASED ON FORWARDING TABLE
2510
RETURN
2520

FIGURE 25

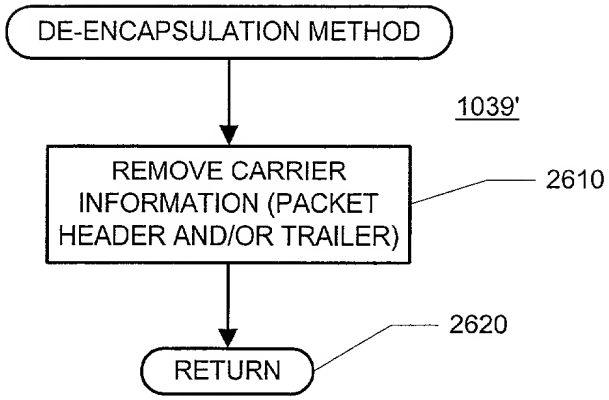

DE-ENCAPSULATION METHOD
1039'
REMOVE CARRIER INFORMATION (PACKET HEADER AND/OR TRAILER)
2610
2620
RETURN

FIGURE 26

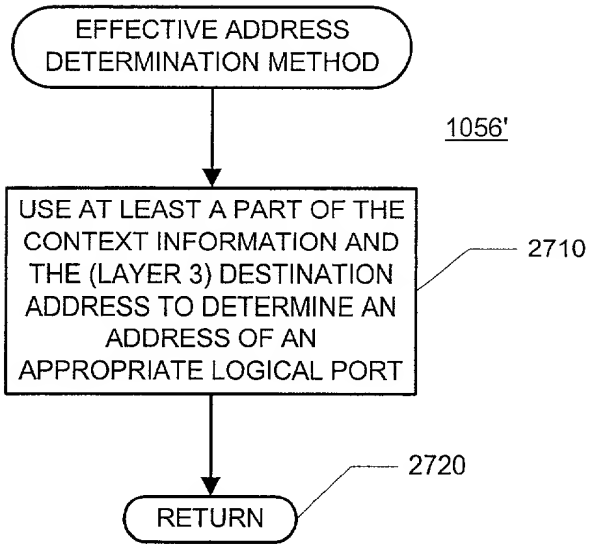

EFFECTIVE ADDRESS DETERMINATION METHOD
1056'
USE AT LEAST A PART OF THE CONTEXT INFORMATION AND THE (LAYER 3) DESTINATION ADDRESS TO DETERMINE AN ADDRESS OF AN APPROPRIATE LOGICAL PORT
2710
RETURN
2720

FIGURE 27

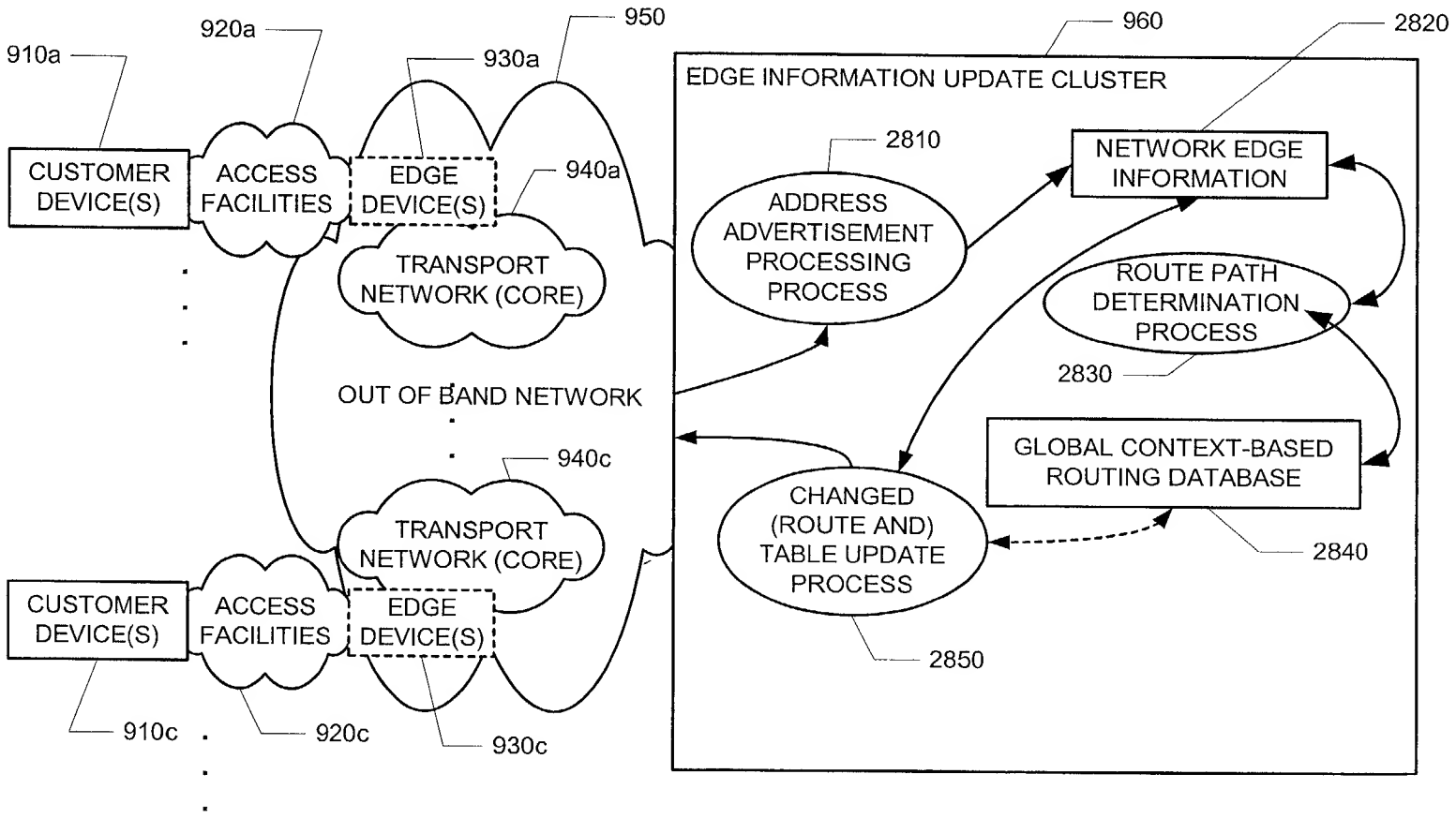

910a
920a
930a
950
960
2820
EDGE INFORMATION UPDATE CLUSTER
CUSTOMER DEVICE(S)
ACCESS FACILITIES
EDGE DEVICE(S)
940a
TRANSPORT NETWORK (CORE)
OUT OF BAND NETWORK
940c
TRANSPORT NETWORK (CORE)
CUSTOMER DEVICE(S)
ACCESS FACILITIES
EDGE DEVICE(S)
910c
920c
930c
2810
ADDRESS ADVERTISEMENT PROCESSING PROCESS
NETWORK EDGE INFORMATION
ROUTE PATH DETERMINATION PROCESS
2830
GLOBAL CONTEXT-BASED ROUTING DATABASE
2840
CHANGED (ROUTE AND) TABLE UPDATE PROCESS
2850

FIGURE 28

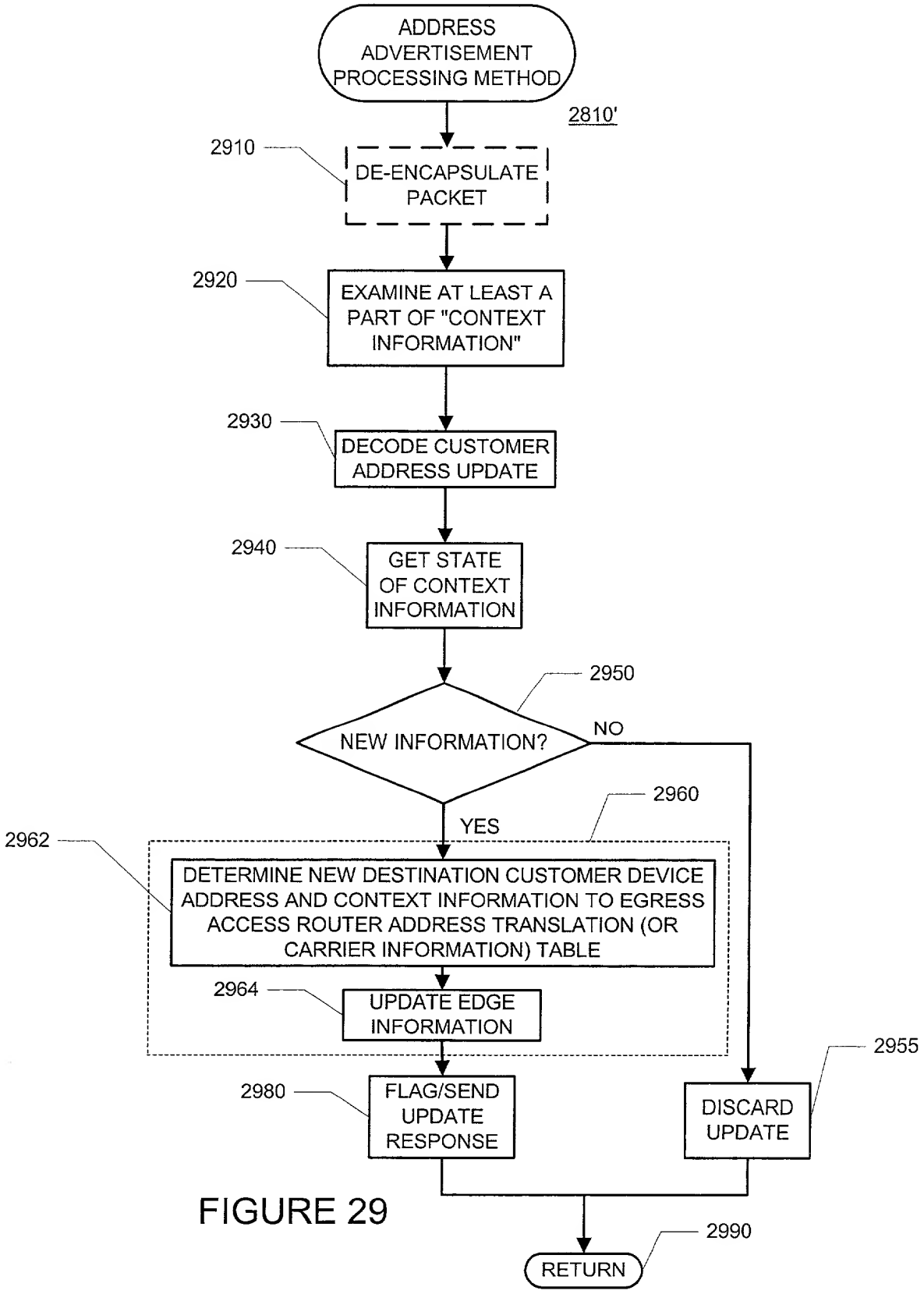

ADDRESS ADVERTISEMENT PROCESSING METHOD
2810'
2910
DE-ENCAPSULATE PACKET
2920
EXAMINE AT LEAST A PART OF "CONTEXT INFORMATION"
2930
DECODE CUSTOMER ADDRESS UPDATE
2940
GET STATE OF CONTEXT INFORMATION
2950
NEW INFORMATION?
NO
YES
2960
2962
DETERMINE NEW DESTINATION CUSTOMER DEVICE ADDRESS AND CONTEXT INFORMATION TO EGRESS ACCESS ROUTER ADDRESS TRANSLATION (OR CARRIER INFORMATION) TABLE
2964
UPDATE EDGE INFORMATION
2955
2980
FLAG/SEND UPDATE RESPONSE
DISCARD UPDATE
2990
RETURN

FIGURE 29

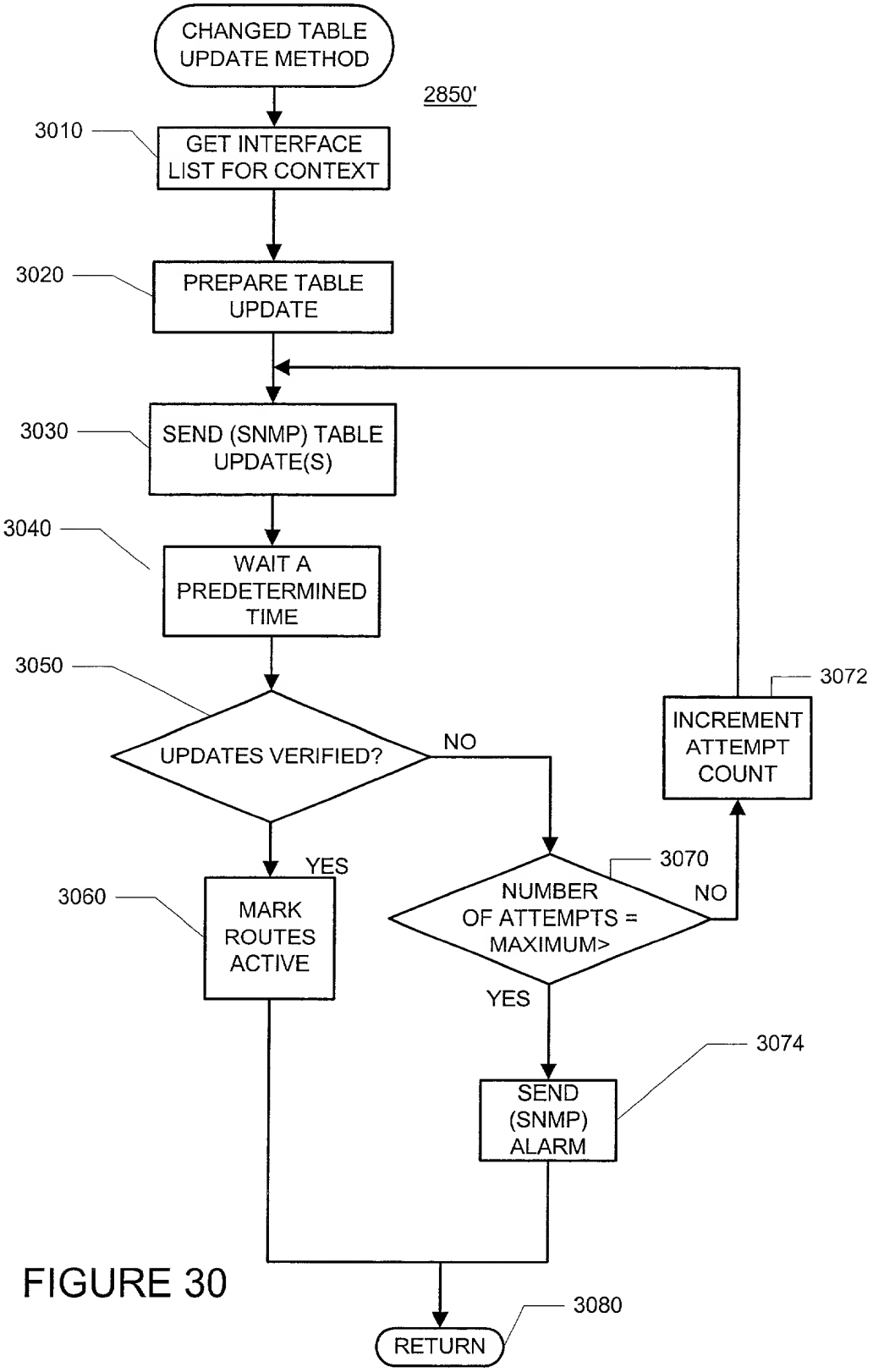

CHANGED TABLE UPDATE METHOD
2850'
3010
GET INTERFACE LIST FOR CONTEXT
3020
PREPARE TABLE UPDATE
3030
SEND (SNMP) TABLE UPDATE(S)
3040
WAIT A PREDETERMINED TIME
3050
UPDATES VERIFIED?
NO
YES
3060
MARK ROUTES ACTIVE
3070
NUMBER OF ATTEMPTS = MAXIMUM>
NO
YES
3072
INCREMENT ATTEMPT COUNT
3074
SEND (SNMP) ALARM
3080
RETURN

FIGURE 30

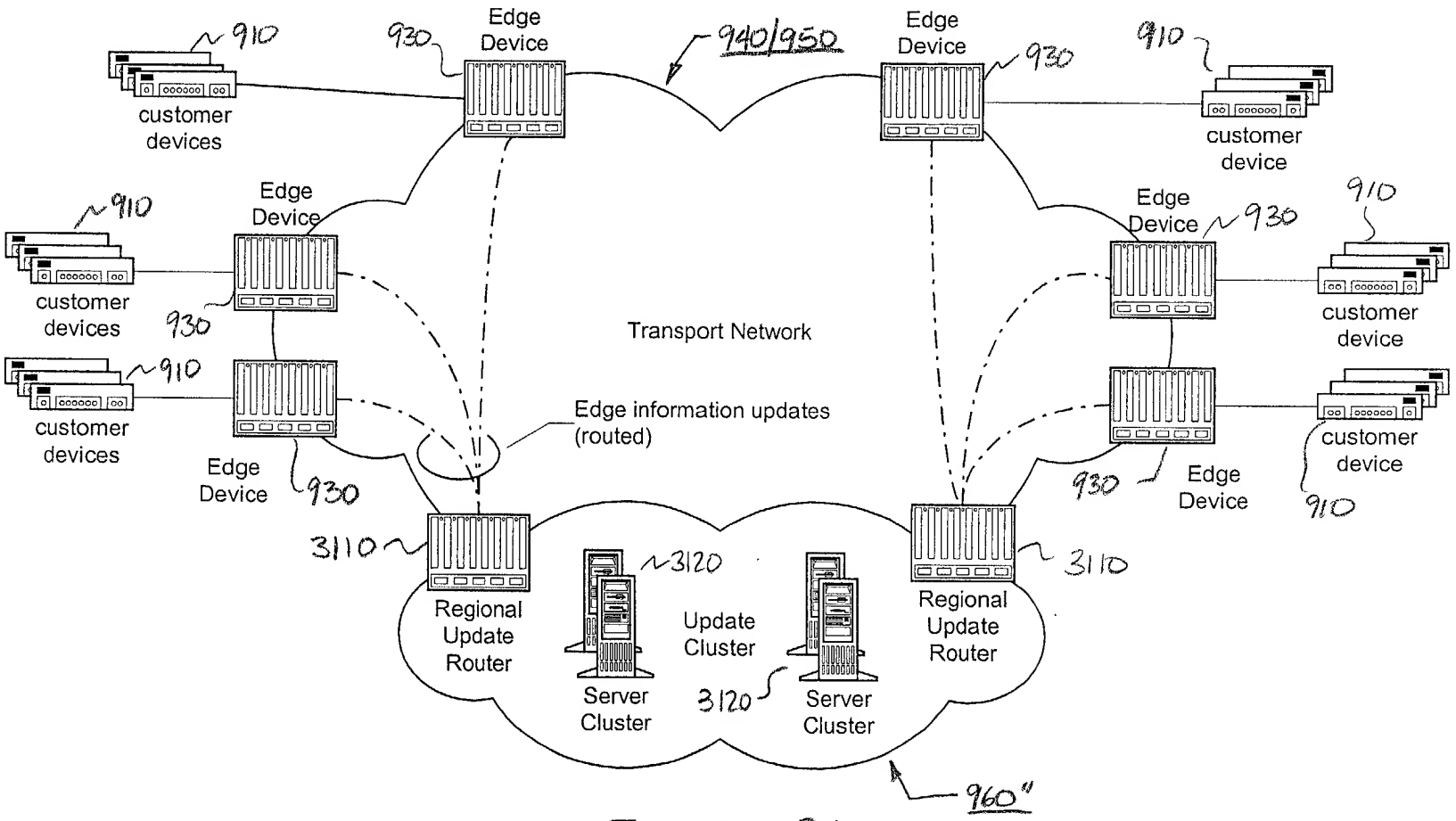

910
customer devices
930
Edge Device
940/950
Edge Device
930
910
customer device
910
customer devices
Edge Device
930
Edge Device
930
910
customer device
910
customer devices
930
Transport Network
910
customer devices
Edge information updates (routed)
Edge Device
930
930
Edge Device
customer device
910
3110
3120
Regional Update Router
Update Cluster
Server Cluster
3120
Server Cluster
Regional Update Router
3110
960"

FIGURE 31

FIGURE 32

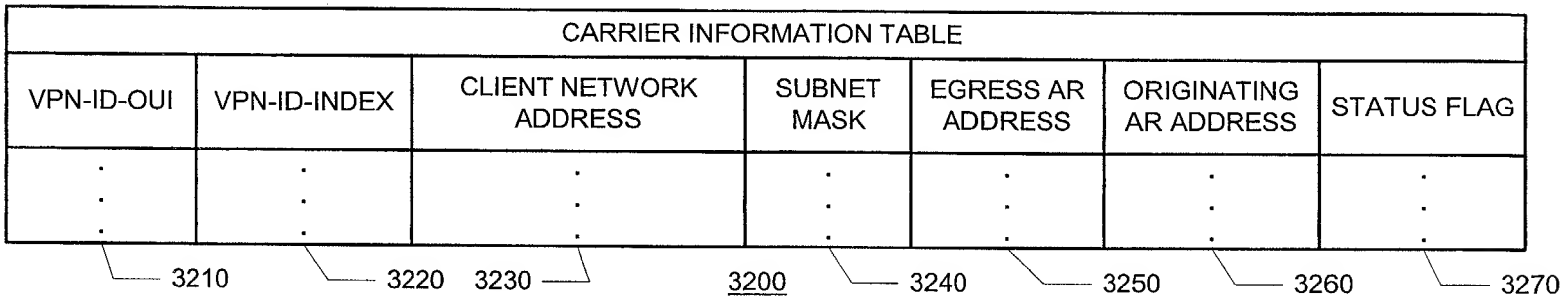


FIGURE 33

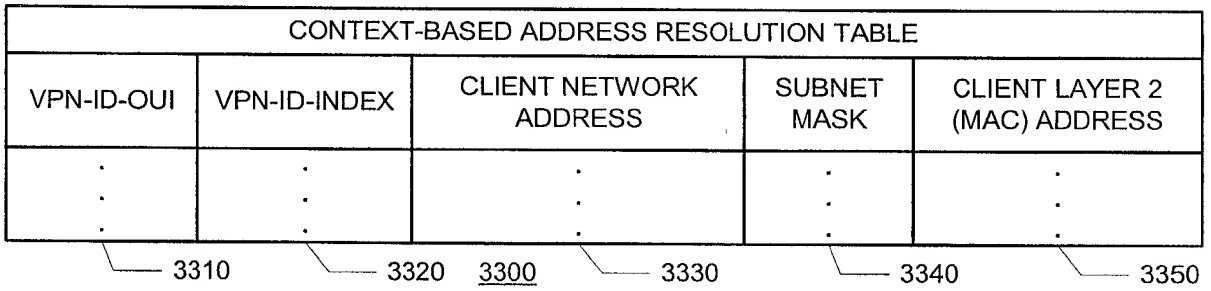


FIGURE 34

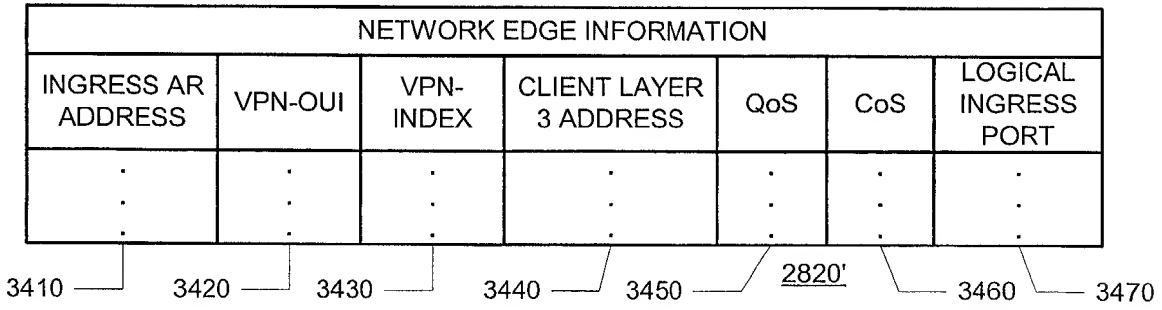


FIGURE 35

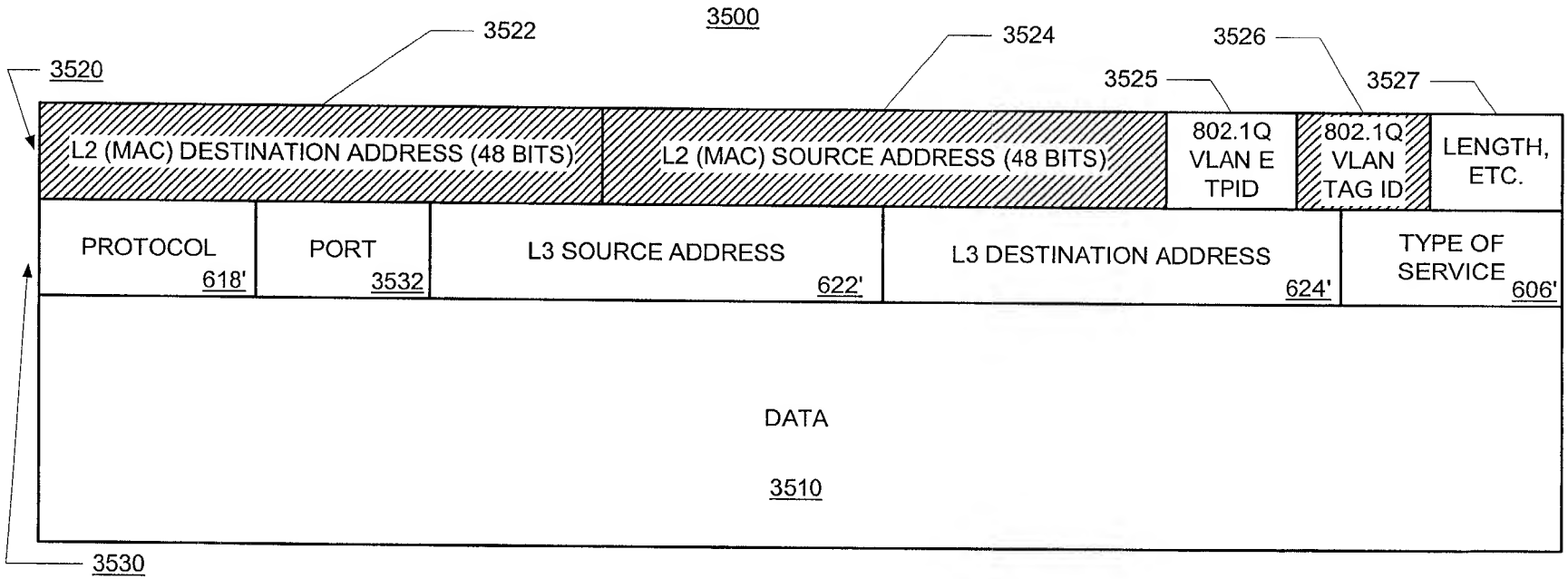

3500
3520
3522
3524
3525
3526
3527
L2 (MAC) DESTINATION ADDRESS (48 BITS)
L2 (MAC) SOURCE ADDRESS (48 BITS)
802.1Q VLAN E TPID
802.1Q VLAN TAG ID
LENGTH, ETC.
PROTOCOL 618'
PORT 3532
L3 SOURCE ADDRESS 622'
L3 DESTINATION ADDRESS 624'
TYPE OF SERVICE 606'
DATA
3510
3530

FIGURE 36

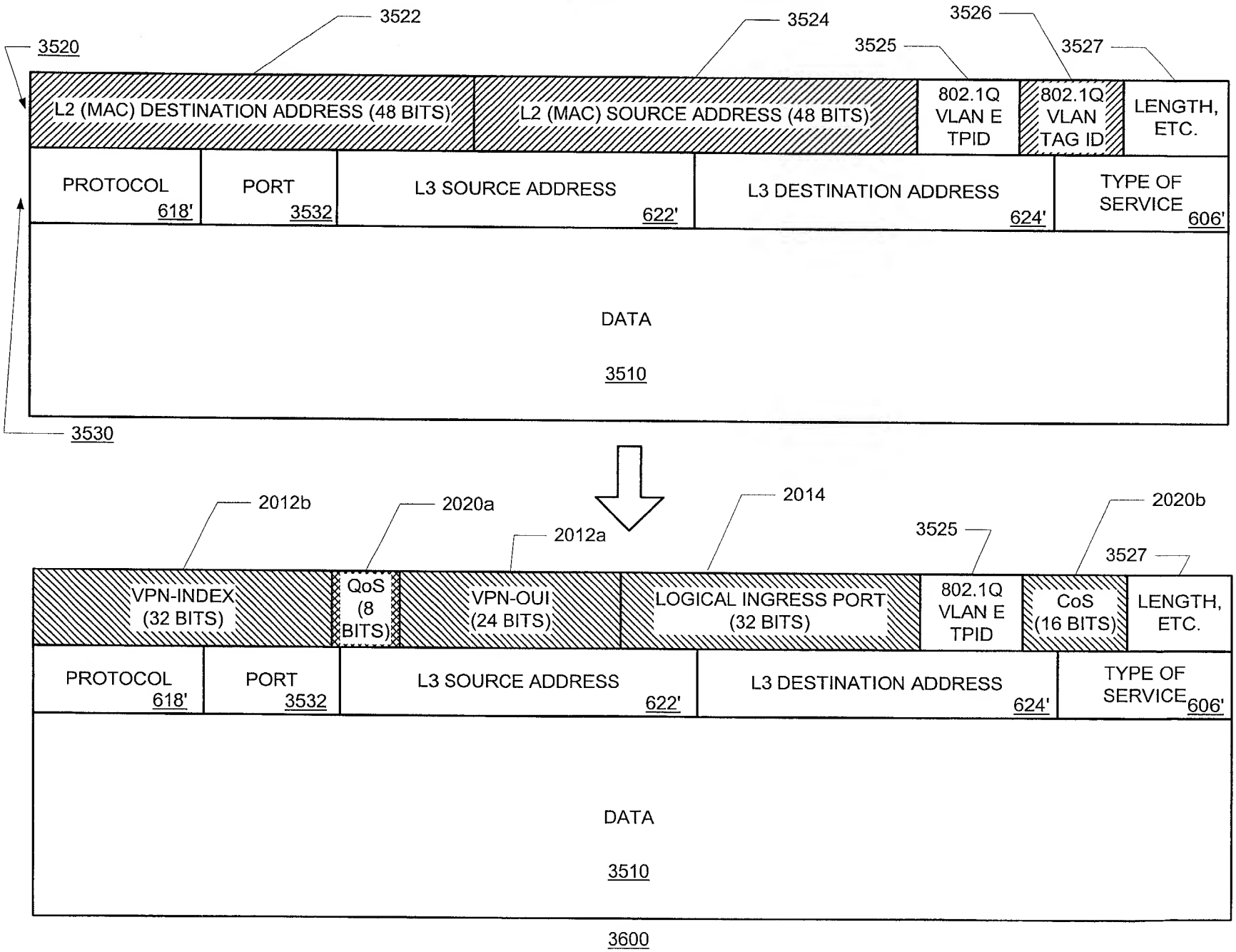
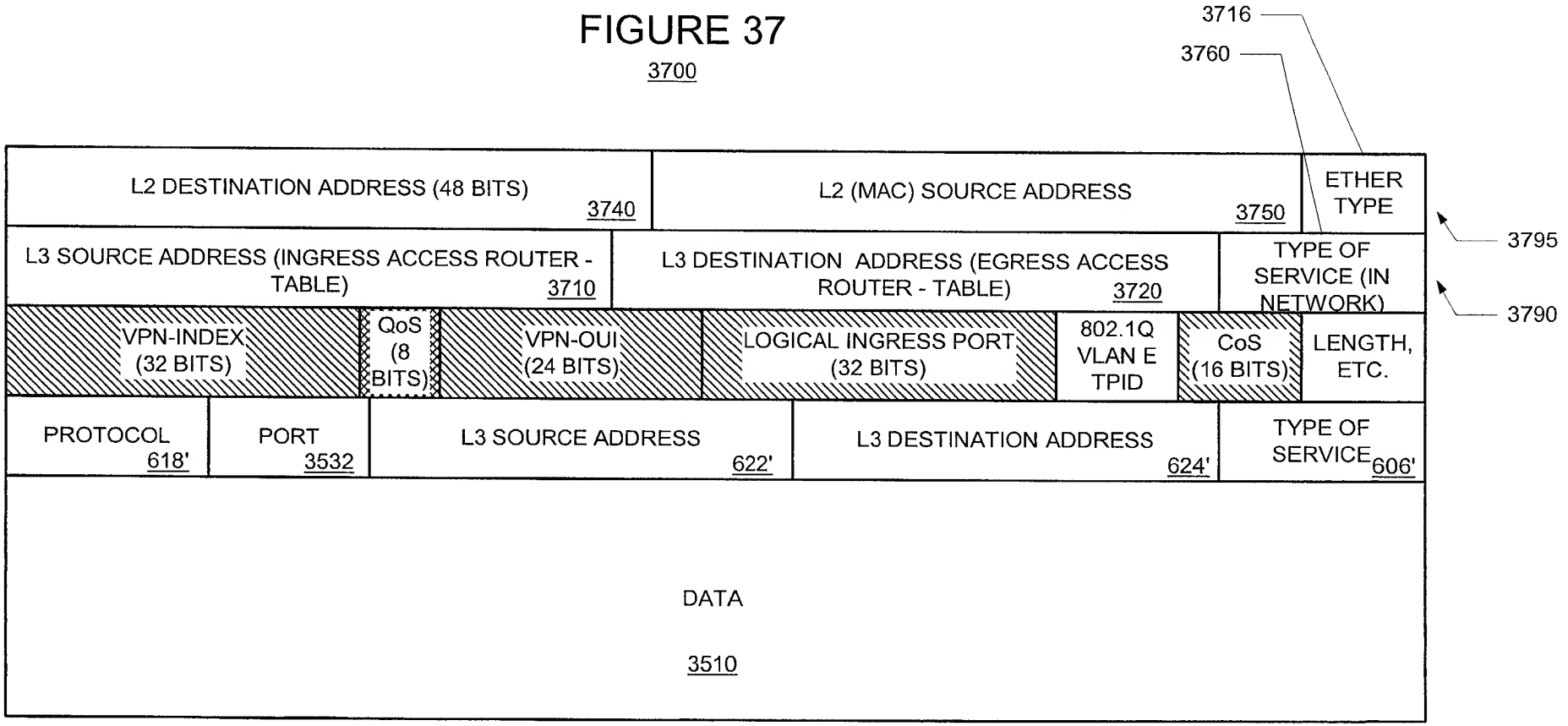

3520
3522
3524
3525
3526
3527
L2 (MAC) DESTINATION ADDRESS (48 BITS)
L2 (MAC) SOURCE ADDRESS (48 BITS)
802.1Q VLAN E TPID
802.1Q VLAN TAG ID
LENGTH, ETC.
PROTOCOL 618'
PORT 3532
L3 SOURCE ADDRESS 622'
L3 DESTINATION ADDRESS 624'
TYPE OF SERVICE 606'
DATA
3510
3530
2012b
2020a
2012a
2014
3525
2020b
3527
VPN-INDEX (32 BITS)
QoS (8 BITS)
VPN-OUI (24 BITS)
LOGICAL INGRESS PORT (32 BITS)
802.1Q VLAN E TPID
CoS (16 BITS)
LENGTH, ETC.
PROTOCOL 618'
PORT 3532
L3 SOURCE ADDRESS 622'
L3 DESTINATION ADDRESS 624'
TYPE OF SERVICE 606'
DATA
3510
3600

FIGURE 37

3700



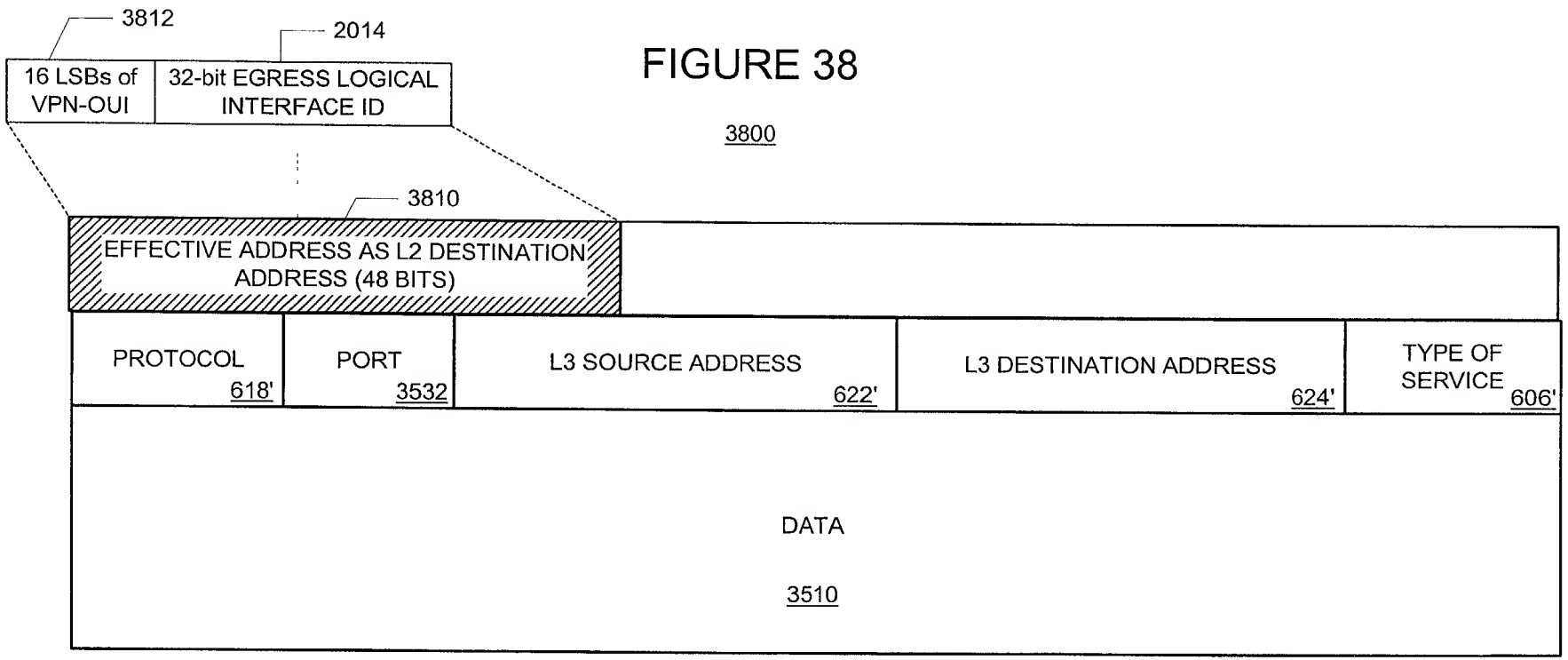


FIGURE 38

3800

FIGURE 39

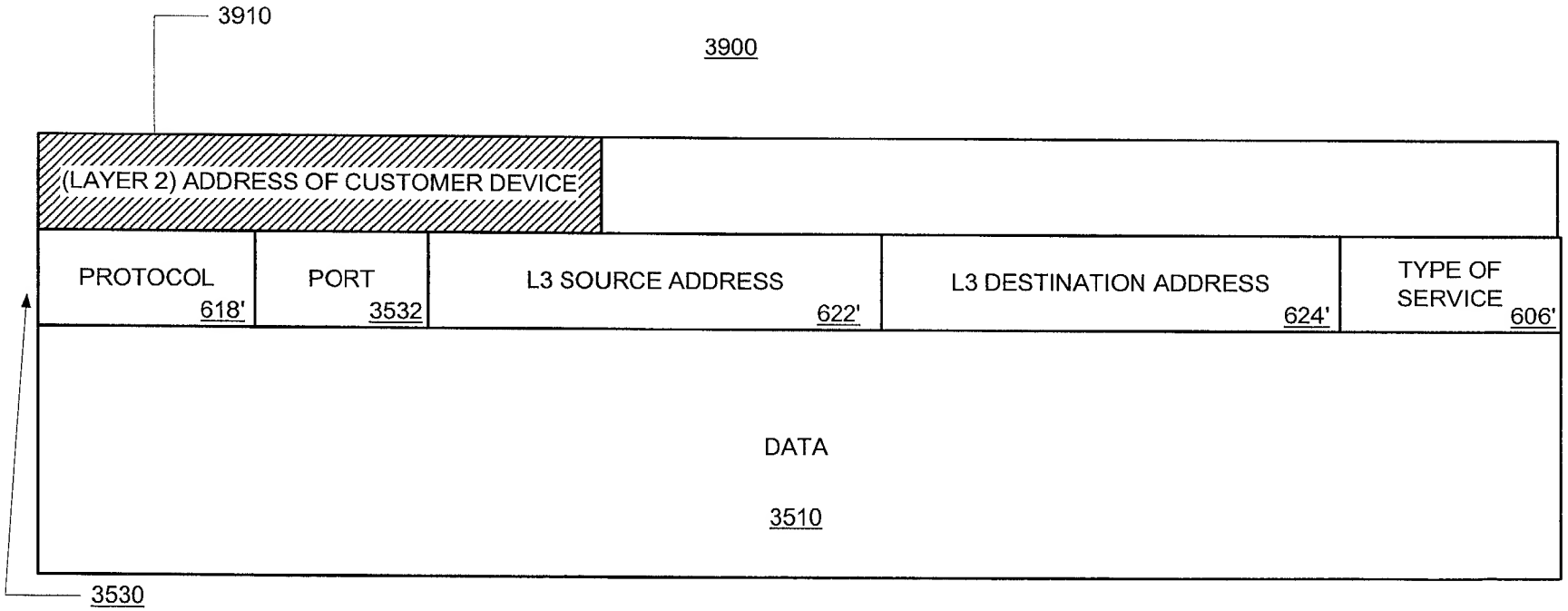
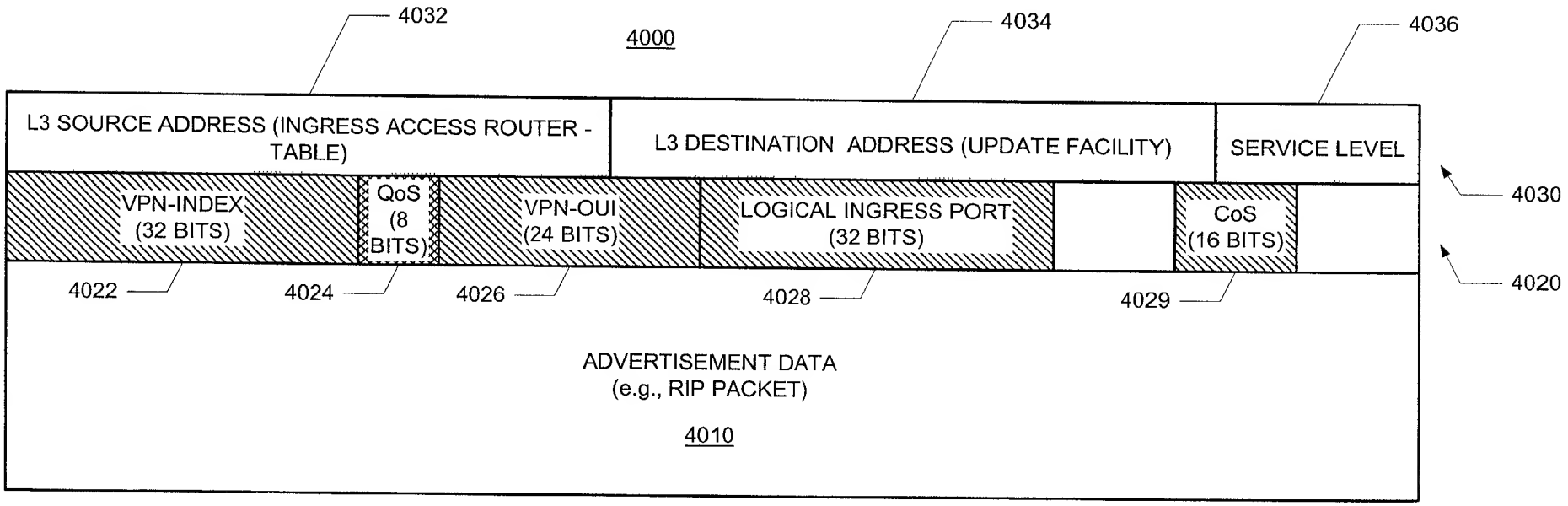

3910
3900
(LAYER 2) ADDRESS OF CUSTOMER DEVICE
PROTOCOL
618'
PORT
3532
L3 SOURCE ADDRESS
622'
L3 DESTINATION ADDRESS
624'
TYPE OF SERVICE
606'
DATA
3510
3530

FIGURE 40


4032
4000
4034
4036
L3 SOURCE ADDRESS (INGRESS ACCESS ROUTER - TABLE)
L3 DESTINATION ADDRESS (UPDATE FACILITY)
SERVICE LEVEL
VPN-INDEX (32 BITS)
QoS (8 BITS)
VPN-OUI (24 BITS)
LOGICAL INGRESS PORT (32 BITS)
CoS (16 BITS)
4030
4020
4022
4024
4026
4028
4029
ADVERTISEMENT DATA
(e.g., RIP PACKET)
4010